care-full fashion report

Master thesis

Amsterdam's ‚care-full' transition

from fast fossil fashion towards
slow circular society

A design exploration on enhancing
the socio-ecological value of circular textile practices
through spatial planning

university
Delft University of Technology

author
Gillian K. J. Weber

studio
Planning Complex Cities

AMSTERDAM'S
CARE-FULL TRANSITION

GILLIAN K.J.
WEBER

PLANNING
COMPLEX CITIES

colophone - p5 report

university *Delft University of Technology* | **faculty** *Architecture and the Built Environment* | **program** *Master of Architecture, Urbanism and Building Sciences* | **track** *Urbanism* | **graduation studio** *Planning Complex Cities* | **leading mentor** *Dr. Marcin Dąbrowski - Spatial Planning and Strategy* | **supporting mentor** *Birgit Hausleitner - Urban Design* | **submission date** *10. June 2025* | **author** *Gillian Weber* | **student number** *5864127*

abstract

The textile industry poses significant environmental and social challenges due to its globalised, linear value chain. In response, cities like Amsterdam are advancing circular economy strategies as part of broader political commitments to ecological sustainability and social equity, notably through frameworks like the Doughnut Economy. This thesis investigates how spatial planning can contribute to a more 'care-full circular' transition of the textile value chain in the Metropolitan Region of Amsterdam.

Building on theories of care ethics and degrowth circularity, the research develops a spatial planning approach that integrates material circularity with socio-ecological values. Through a combination of policy analysis, spatial design exploration, and stakeholder engagement, the thesis demonstrates how spatial planning can operationalise circular ambitions at different scales. It argues that circular spatial planning must not only accommodate flows of textile production, reuse, repair, and recycling, but also intentionally design for care - care for materials, space, time, circular workers, and differences within communities.

The proposed care-full approach includes activating underused spatial assets and repurposing existing infrastructures to support collective and commercial textile looping; improving spatial quality and accessibility; enabling shorter, zero-emission textile loops; capacity building in vulnerable communities through facilitating spaces for skill sharing and social interaction; valuing circular workers and raising awareness among consumers, and recognising the contribution of circular workers while promoting consumer awareness. Based on this framework, the thesis presents a spatial vision and strategic recommendations for the Metropolitan Region of Amsterdam that align spatial planning, policy frameworks, and governance mechanisms to support an inclusive and place-based circular textile transition.

By bridging urban design, spatial planning, governance, and circular economy policy, this thesis contributes to academic and political debates on how the circular economy can be spatialised in socially just and ecologically viable ways, thereby demonstrating an approach to operationalising the Doughnut framework. It demonstrates that spatial planning can play a critical role not only in closing material loops but also in fostering socio-ecological value for cities undergoing circular transitions.

keywords
spatial planning, circular transition, textile industry, degrowth circularity, lens of care, Doughnut economics

'If the girl who made your skirt's not paid
you cannot say it's beautiful
if the pay is less than living wage
you cannot say it's beautiful
if the coloured dyes now lie in rivers
poisened fish, polluted waters
if there's no sick pay, no toilet breaks
if the factories are in decay
no matter what your mirror says
you cannot claim it's beautiful' - Holly McNish

fig. 1 ***Retail store, Amsterdam Kalverstraat***
source // author, March 2025

editorial note

author's positionality

Growing up with parents who experienced resource scarcity in the German Democratic Republic (GDR) taught me to value the abundance of opportunities and material goods available today. However, another formative experience that continues to motivate my research occurred during high school when I spent a year living and studying in China. There, I witnessed extreme social and economic contrasts - between poverty, the emerging working class, and wealth - while being welcomed into families in both cities and rural areas. This gave me insight into local culture, customs, and language, as well as different attitudes toward the environment and living standards. I found myself in the heart of the global textile industry, where people and nature were exploited. One vivid memory is shopping for clothes with my host mother in a wholesale mall (see Fig. 2), where I was shocked by the extremely low prices and vast quantities of textiles. I thought, „This can't be right," and that feeling has stayed with me ever since. Reflecting now, I recognise that European consumption patterns drive much of this demand. The fact that these issues have only intensified over the past twelve years makes me question our societal values and leaves me deeply concerned about the future.

fig. 2 ***Wholesale mall for clothing in Zhengzhou, China***
source // author, 2013

introduction

I

Textiles are part of our everyday lives, yet it's easy to lose sight of the machinery that goes into satisfying one of our basic needs - clothing. Wait, is it really just about meeting our basic needs?
The textile industry is one of the fastest growing industries in the world, with production doubling in the last 15 years and clothing becoming the 7th most traded commodity (OEC, 2022). Fast fashion and now ultra-fast fashion business models accelerate production and our consumption, making it one of the most environmentally and socially damaging value chains due to its globalised system of different actors and stakeholders exploiting natural and human resources (Rijksdienst voor Ondernemend Nederland, 2024). These problems are deeply rooted in cultural values and social norms that associate material wealth with success and happiness, reinforcing unsustainable patterns of production and consumption.
In response, growing ambitions for change have begun to shape political agendas. The Netherlands, and the city of Amsterdam in particular, have set a goal of achieving a fully circular textile value chain by 2050. However, scholars have criticised policy initiatives for following the concept of ‚green growth' - economic development with a reduced environmental footprint - while neglecting the cultural roots and distributional shortcomings of the capitalist system (Savini, 2019).
This thesis argues for a more thoughtful, ‚care-full' (Bono et al., 2024) approach to the regional transformation of the textile value chain in the Metropolitan Region Amsterdam. By prioritising inter-human and human-nature connections, it envisions a shift from fast fossil fashion towards a slow fashion circular society. This approach emphasises a redefinition of values and consumption patterns, recognising the urgent need for a new fashion paradigm that is in line with ecological and social limits locally and therefore globally.

ultra fast fashion is a business model that speeds up the process of design to a finished piece of clothing in just under 48 hours

fast fossil fashion refers to the fast fashion industry's reliance on fossil fuels throughout its value chain

problem field

II

a consumption society
living in abundance

In his book ‚The Consumer Society', Jean Baudrillard (2012) critiques modern materialism and overconsumption, emphasising how consumption has become a major aspect of contemporary life. In this societal model, goods are no longer valued for their utility but as symbols of status, identity, and cultural belonging. Today, fast fashion embodies this trend, enabling rapid and excessive consumption at the expense of environmental sustainability. This is driven by societal values that equate material abundance with success and happiness, exacerbating environmental degradation and social inequalities on a global scale (Jackson, 2021).
The concept of Earth Overshoot Day (fig. 4) underlines this. It measures the day, on which humanity consumed more resources than the planet can regenerate in a year. In 2024, the global demand of resources overshot after seven months. For the Netherlands, this tipping point arrived after five months already.

Globally, the fashion industry is a major contributor to the overconsumption of natural and fossil resources (United Nations EnvironmentProgramme, 2020). In Europe the consumption of clothing rose by 40% in the last 20 years (EPRS, 2019). The Netherlands reflects this trend by ranking second highest worldwide for clothing consumption (fig. 4). This highlights the urgency of addressing overconsumption of resources in general, and in particular the overconsumption of clothing in the Netherlands and the EU.

A recent Financial Times article (fig. 5) raises concerns that the Netherlands may soon become the first country to „hit the limits" (Kuper, 2022) of economic growth. This is based on the country's significant ecological footprint and inability to sustain consumption levels within planetary boundaries. Currently, the Netherlands ranks highly in terms of GDP, placing third among European countries (European Union, 2024). However, the concept of prosperity in the Netherlands has evolved beyond material wealth. The Dutch government introduced the Broad Prosperity Index (Brede Welvaart), which complements GDP by measuring societal well-being. This index considers factors such as health, education, environmental quality, social cohesion, personal development, security, and material wealth. The index indicates high levels of prosperity in the Metropolitan Region Amsterdam (fig. 6), exemplifying this balance while highlighting the challenges of maintaining it and reducing ecological impacts.

By challenging the values of materialism and embracing sufficiency, the Netherlands and Amsterdam have the opportunity to redefine societal consumption patterns and therefore the definition of prosperity. This shift requires both systemic changes and communal commitment to living within ecological limits.

fig. 3 ***News article in the Calpirg***
source // Horvath & Meiffren-Swango (2024)

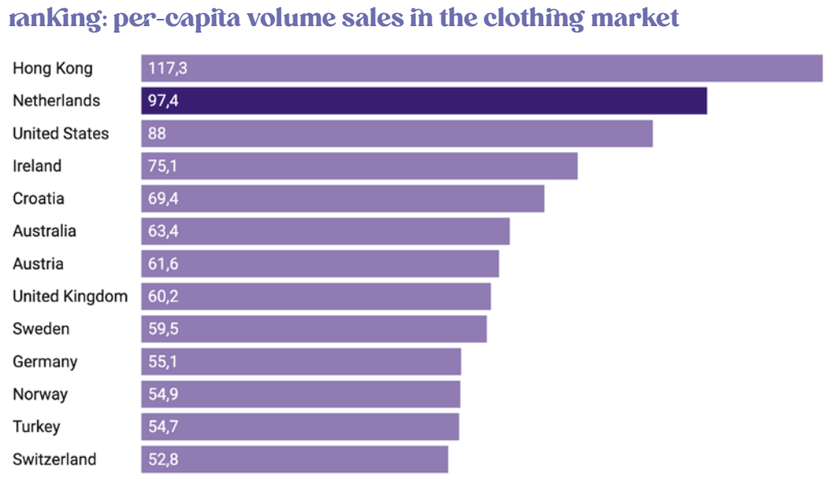


fig. 4 ***Per-capita volume sales in the global clothing market***
source // author, adapted Cardona, 2025

fig. 5 ***News article in the Financial Times***
source // Kuper (2022)

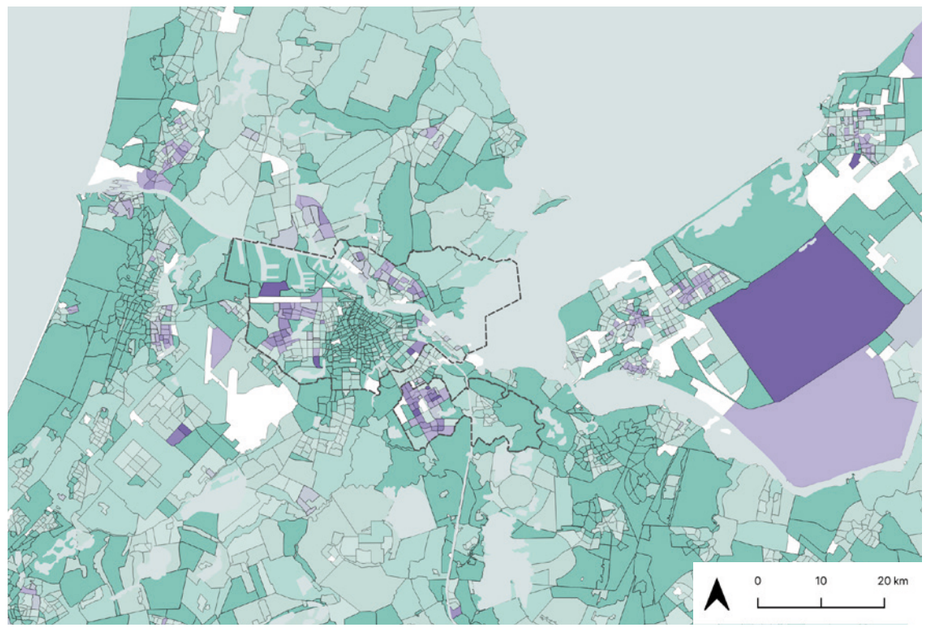


fig. 6 ***Livability Index***
source // author based on Ministrie van Binnenlandse Zaken en Koninkrijksrelaties (2022)

a consumption society
social pressures through distribution shortages

Despite of stating a countrywide high broad prosperity index and a strong economy, the Netherlands faces significant challenges with economic inequality. Many households, particularly in major cities such as Amsterdam, Rotterdam, and Den Haag, struggle to make ends meet. Recently, Amsterdam was ranked as the city with the highest poverty levels in the Netherlands (Sevil, 2024). This suggests that the benefits of economic growth are not equally distributed among the population, thereby undermining the inclusivity of prosperity.

The Broad Prosperity Index reveals worrying trends in social cohesion and loneliness, in addition to economic disparity (fig. 7).
While economic growth has improved living standards in many ways, it often promotes material progress and possession as central societal values. This focus can distract from social connection and a sense of belonging, as Jackson (2021) argues.
To address these issues, we must rethink our societal values, reduce materialism, and foster inclusive networks that prioritise social connection and collective well-being over individual wealth and materialism.

„But the burden of having can obscure the joy of belonging.“ - Tim Jackson, 2021

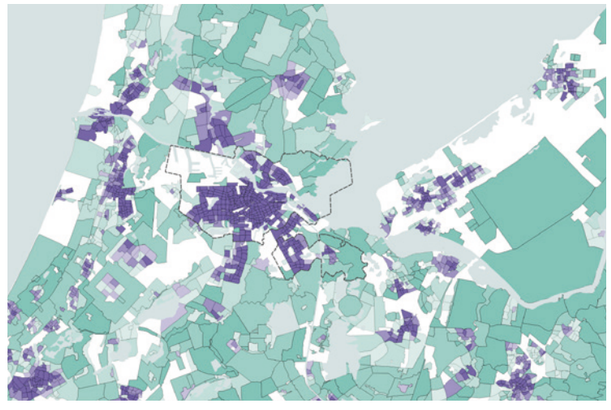


fig. 7 ***Social cohesion score***
source // author based on Ministrie van Binnenlandse Zaken en Koninkrijksrelaties (2022)

„New poverty figures: Amsterdam has the most poverty, now more than Rotterdam“
- news heading in the Parool (Sevil, 2024)

fig. 8 ***Unhoused person on main shopping street Kalverstraat***
source // author, shot in February

the global textile value chain

With 98% of its clothing imported from abroad, Amsterdam is part of a globalised and highly complex textile value chain (Amsterdam Economic Board, 2022).

Since the location of different production activities is largely determined by the search for the cheapest labour and resources, the value chain is geographically dispersed across the globe (see fig.9). Countries of the Global North are mainly associated with the consumption of clothing, while countries of the Global South are associated with the production of it (United Nations EnvironmentProgramme, 2020). The highly specialized production locations are connected by the exchange and trade of different products related to textile as shown in fig. 10. The green arrows show the material flows from raw material sourcing through fibre production and clothing manufacturing to the point of consumption and use. The blue arrows show the ‚end-of-life' flows after the clothing has been used and discarded. As the Netherlands is one of the world's top ten exporters of used clothing, these clothes often end up back where they were produced - in the Global South. It is estimated that only 5% of discarded clothing in Europe is recycled into new clothing (Xu et al., 2022).

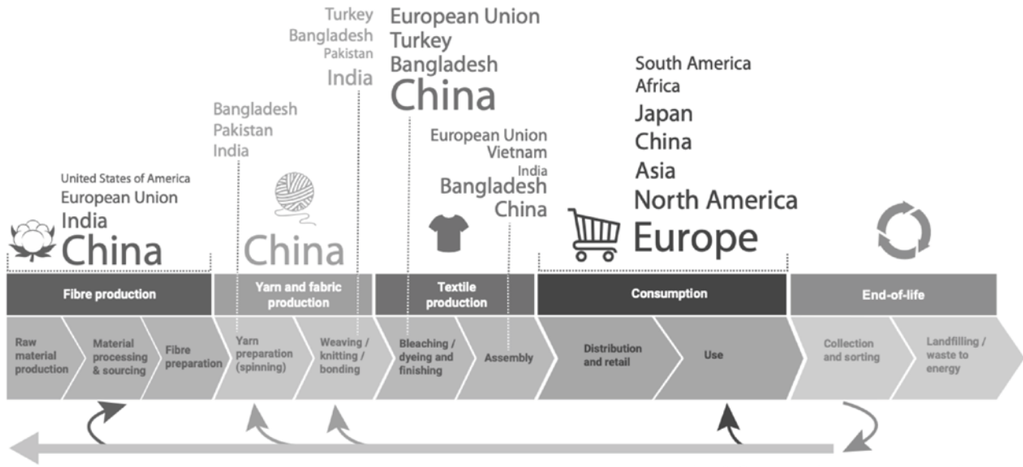


fig. 9 ***Geographical breakdown of global textile production & consumption***
source // UNEP (2020)

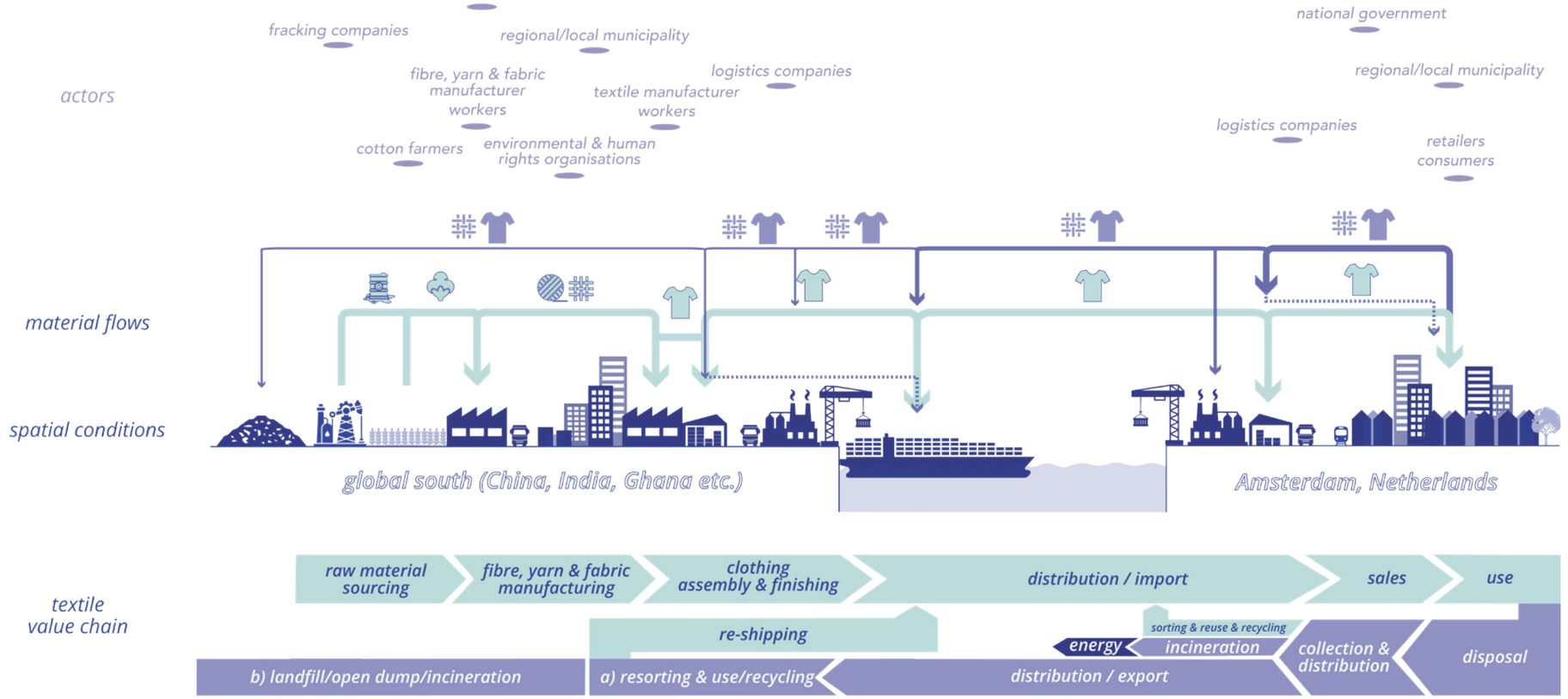


fig. 10 ***Global systemic section showing textile flows and stakeholders along the textile value chain***
source // author based on (Xu et al., 2022)

textile waste colonialism

The term ‚waste colonialism', first introduced in the 1989 UNEP Basel Convention, highlights the practice of exporting unwanted waste, such as used textiles, from high-income to low-income countries under the pretence of charity.

Despite a 2019 amendment to the Basel Convention banning the export of hazardous waste from developed to developing countries, textiles remain excluded from this definition. The waste-receiving nations bear the social, environmental and economic costs of managing low-quality or hazardous waste, which damages the natural environment and the livelihoods of vulnerable communities (Circle Economy, 2023).

Given that the Netherlands is one of the world's top ten exporters of used clothing (Circle Economy, 2023), it can be seen as a 'waste coloniser'. Figure 12 shows the top destinations of exported textiles leaving the Netherlands. The Circle Economy (2023) found that used textiles from high-income nations with extensive waste management systems, like the Netherlands, are partly being exported to import-export hubs such as Pakistan or Poland, before they wind up in lower-income countries such as Kenia, which typically lack the infrastructural capacity to manage the incoming volumes of textiles. The other part is directly transported to disposal, reuse or recycling destinations, such as Ghana or India (Circle Economy, 2023).

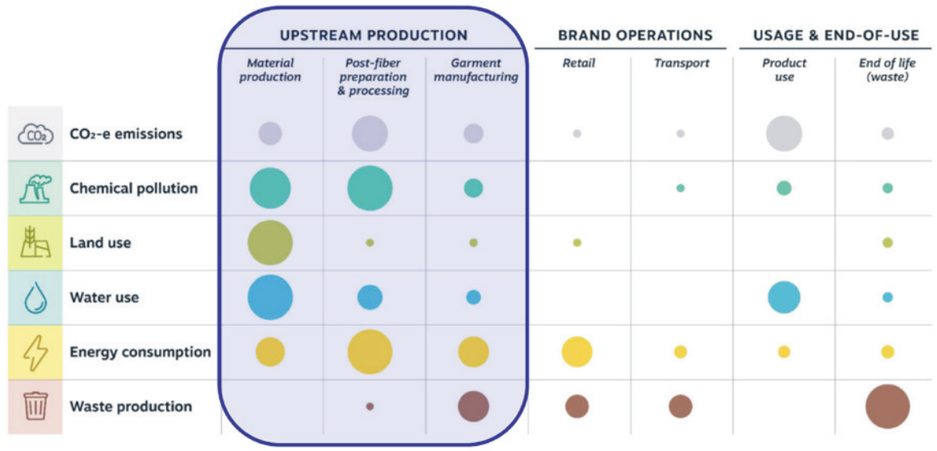
The most severe environmental impacts associated with textile waste in destination countries are related to improper incineration and disposal due to a lack of processing infrastructure. Those impacts include open burning, unmanaged landfills, toxic chemicals from microplastics polluting air, soil and water (Circle Economy, 2023).

The socio-economic impacts mainly relate to health and safety issues, low job security, unfair wages, exploitation of vulnerable workers, and child labour (Circle Economy, 2023).

Additionally, since 98% of the clothes worn in Amsterdam were produced abroad, even more negative impacts are externalised (fig. 11).

Thus, the consumption and discard of textiles in the Netherlands causes severe environmental and socio-economic harm elsewhere in the world.

fig. 11 ***Environmental impacts caused by clothing production***
source // Xu et al. (2022)



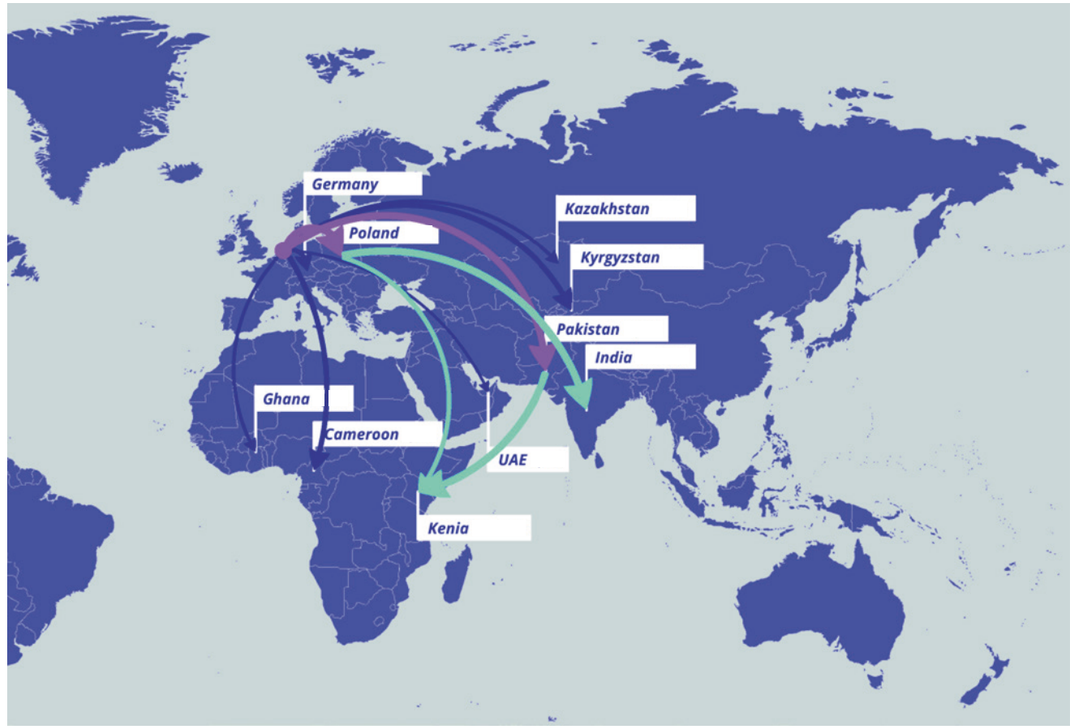
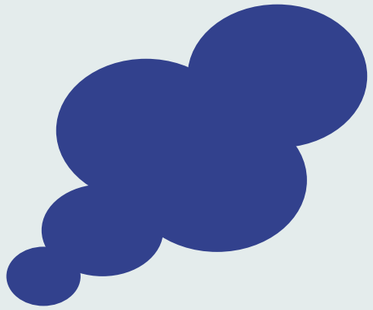


fig. 12 ***Map of textile waste flows from the Netherlands***
source // author based on (Circle Economy, 2023)

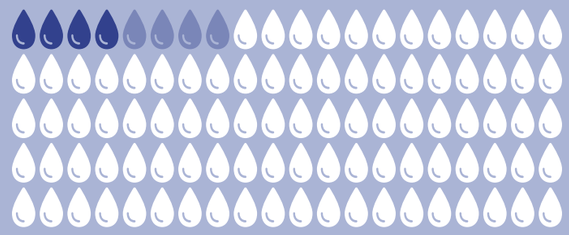
global environmental & social impacts

17-20%
of industrial water pollution through textile dyeing & treatment



3-7%
of global human-derived CO2 emissions from fibre production

4%
of global freshwater use for textile production,
estimated increase of 50% by 2030



4% *nitrogen*
7% *herbicides*
16% *pesticides*

through cotton production

2,5%
of global agricultural land use for cotton cultivation

<2%
of garment workers worldwide earn a living wage (despite full-time employment)

fig. 13 ***Concerning ecological and social impacts of the tetxile value chain***
source // author based on Igini, 2023

political ambitions for change

Significant political ambitions and initiatives are being taken at national and local levels to address the challenges of linear product flows in the economy as a whole and for the textile industry in particular.

All policy goals and strategies strive for 100 % circularity by 2050 (fig.14). However, estimates show that only 5% of textiles on the Dutch market are from recycled materials (Xu et al., 2022), which is still far from the goal of 30% by 2030. Researchers critique, that policy approaches in the Netherlands only focus on end-of-pipe solutions provided through innovative technologies, while neglecting societal implications such as patterns of overconsumption (Calisto Friant et al., 2021; Campbell-Johnston et al., 2020).
The Metropolitan Region Amsterdam (MRA) plays an important role in the Dutch Circular Textile Valley (DCTV), which is a national initiative seeking to accelerate the transition to a circular textile economy. The goal is to bring together stakeholders from various sectors, including industry, government, academia, and civil society, to collaborate on creating circular solutions and scaling successful practices across the Netherlands to drive systemic change.

Furthermore, the municipality of Amsterdam has set itself the goal to implement a circular economy according to the Doughnut model (Raworth et al., 2020), which conceptualises prosperity respecting both ecological and social limits (Raworth, 2018). However, scholars critique the ambiguous political commitment of various municipal departments towards this socio-ecological approach to circularity (Savini, 2019; Thompson et al., 2024). Savini calls it the 'green growth coalition' (2019), that develops the circular economy in 'capitalist socio-spatial relations' (Thompson et al., 2024), thus not focusing on social foundation of the Doughnut, but searching for another way of growing the economy. It is argued that power is very much centralised within the municipal departments that control urban and economic development which often leads to prioritising economic interests (Thompson et al., 2024).

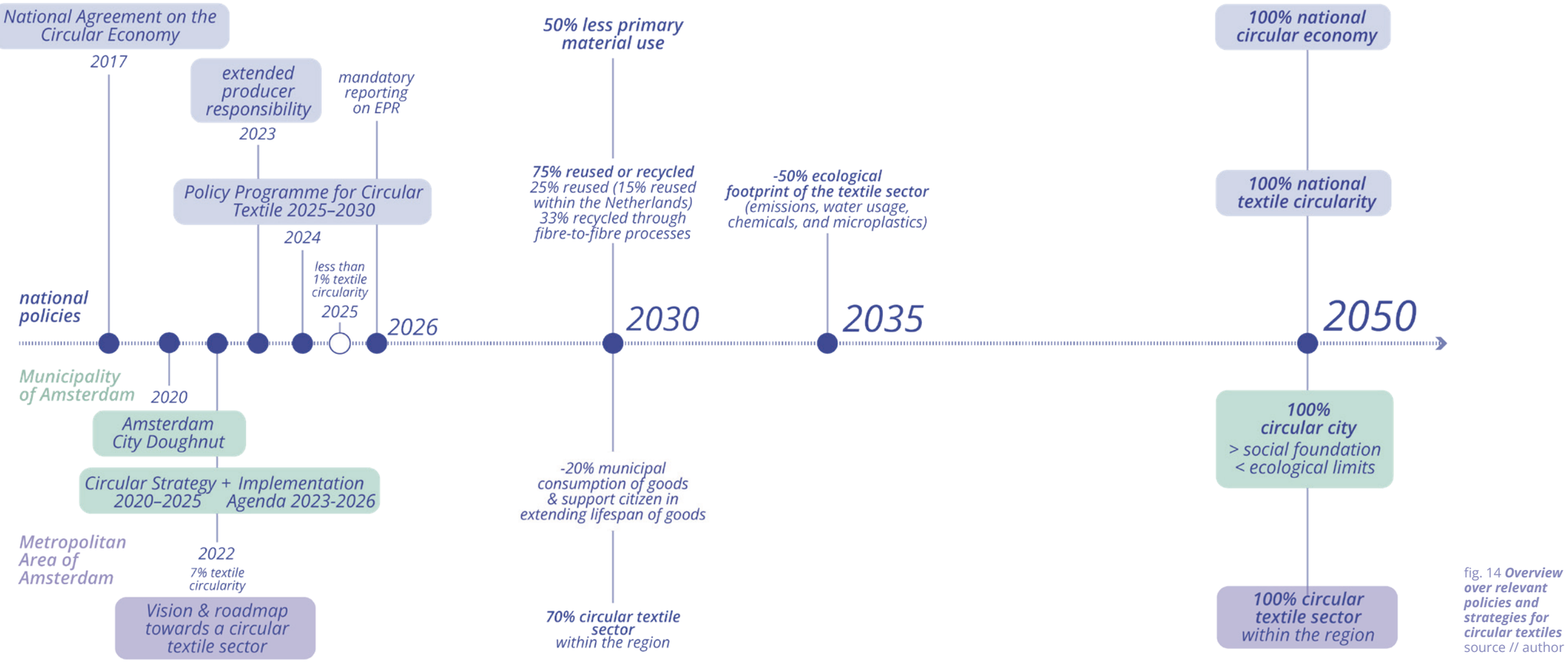


fig. 14 ***Overview over relevant policies and strategies for circular textiles***
source // author

the Amsterdam city doughnut

In 2020, Amsterdam committed to building a circular economy grounded in the doughnut model (Raworth, 2017), aiming to operate within planetary boundaries while protecting the city's social foundation and therefore the well-being of its residents. This ambition serves as a motivational framework for this thesis, which focuses specifically on the textile value chain and addresses both the social and environmental challenges inherent to it. The research prioritises operationalising the social foundation of the doughnut by enhancing social well-being, strengthening community cohesion, enabling fair and inclusive work opportunities, improving income security, expanding access to amenities and health, and fostering active citizen empowerment. The ecological dimension is addressed through advancing circularity within the textile sector.

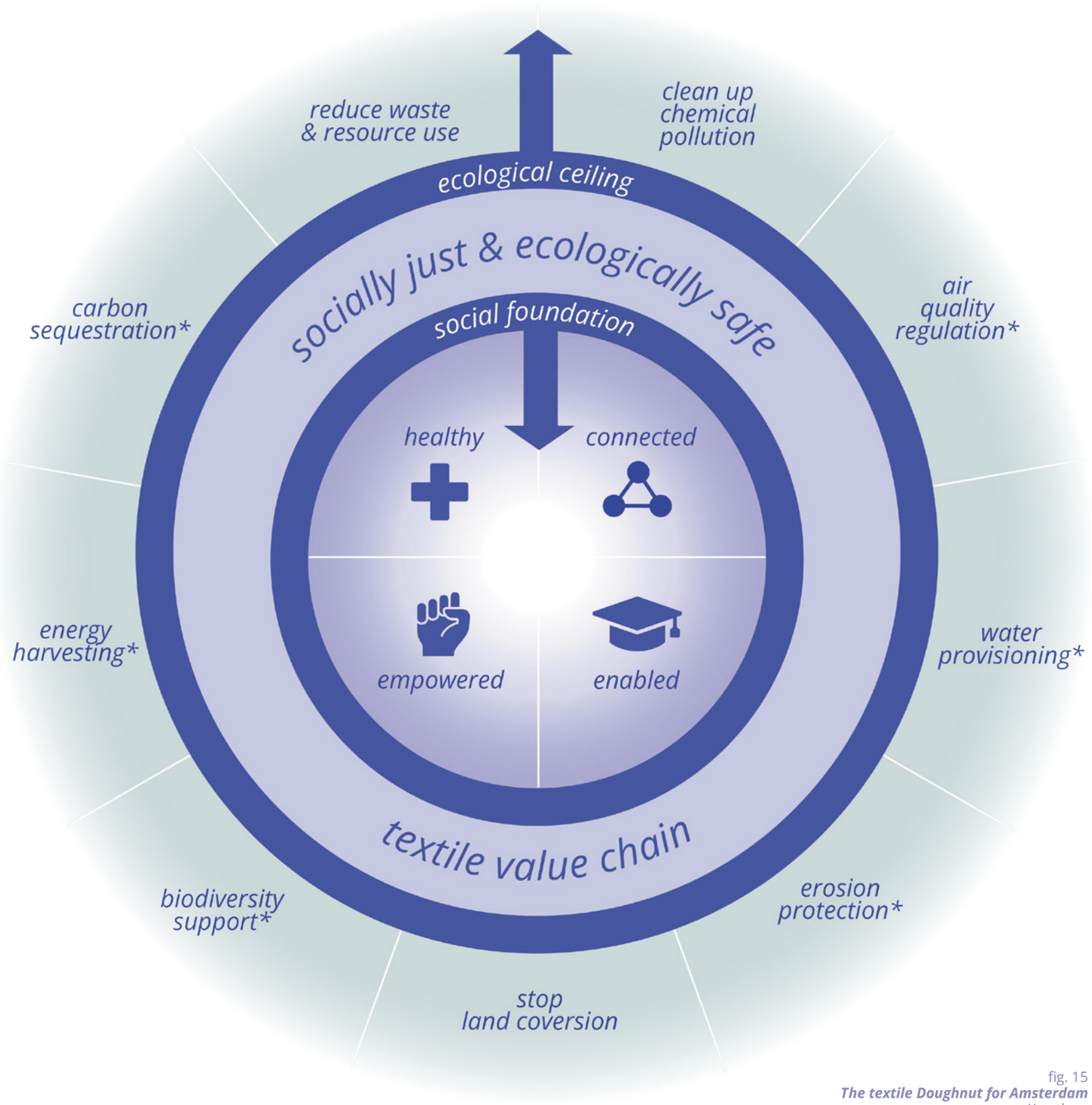


fig. 15
The textile Doughnut for Amsterdam
source // author,
adapted from Raworth et al., 2020

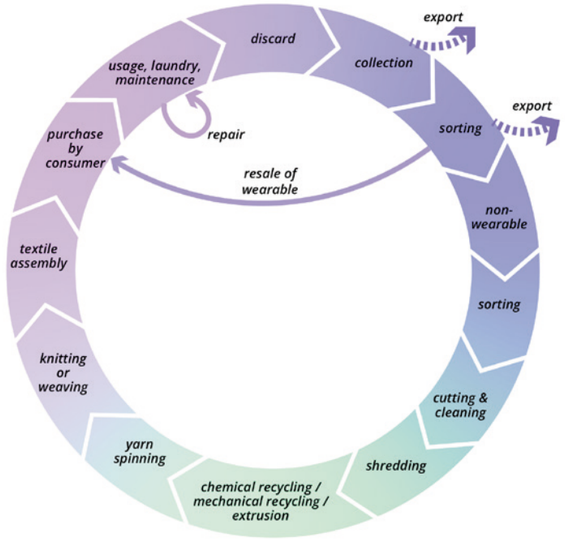


fig. 16 ***Circular textile processes*** source // author based on Luiken & Brinks (2020)

circular strategies
in the textile value chain

The concept of the R-ladder indicates the degree of circularity of products and materials.

The R-ladder (fig. 17) has 10 steps (R0 to R9) that represent different strategies to circulate materials. Strategies higher on the ladder save more raw materials. Therefore, the higher a strategy is, the more circular the strategy is considered (Malooly & Daphne, 2023). Even though the first three strategies (R0-R2) do not actually suggest to loop materials, they are fundamental to a 'care-full' approach to circularity. Refusing to buy new clothing at all, rethinking personal or societal consumption and production patterns or simply reducing clothing purchases address the root causes of challenges related to the textile value chain - overconsumption. The strategies R3 to R7 are about targeting actual circulation of materials and clothing items: the reuse, repair, refurbishment, remanufacturing or repurposing of existing textiles can further reduce new material use by extending the life cycle of existing products. The strategies of recycling and recovering materials are less desirable, but still considered circular. For clothing, chemical or mechanical recycling requires additional input or resources such as water, energy or chemicals (Luiken & Brinks, 2020). When assessing the environmental impacts of the different R-strategies applied to textiles compared to producing new clothing it becomes clear that implementing circular strategies to the textile value chain carries high potentials. It is estimated that the overall environmental impact, including CO2 and water savings, of reusing clothing is 70 times lower than production. For each high/ medium-quality clothing item that is reused 3kg of CO2 is saved (Hins, 2025). Even though the R-ladder suggests to prioritize reuse before repair, research on textiles shows that repair is among the most resource-efficient strategies compared to reuse or recycling, due to its minimal inputs (e.g., thread, energy for sewing) while maximizing the utility of existing products (Sandin & Peters, 2018). The Ellen MacArthur Foundation (2017) found that extending the lifetime of a garment through repair by only 9 months can reduce its carbon, water, and waste footprint by 20–30%.

life cycle refers to the complete sequence of stages that a product goes through from its production to its end

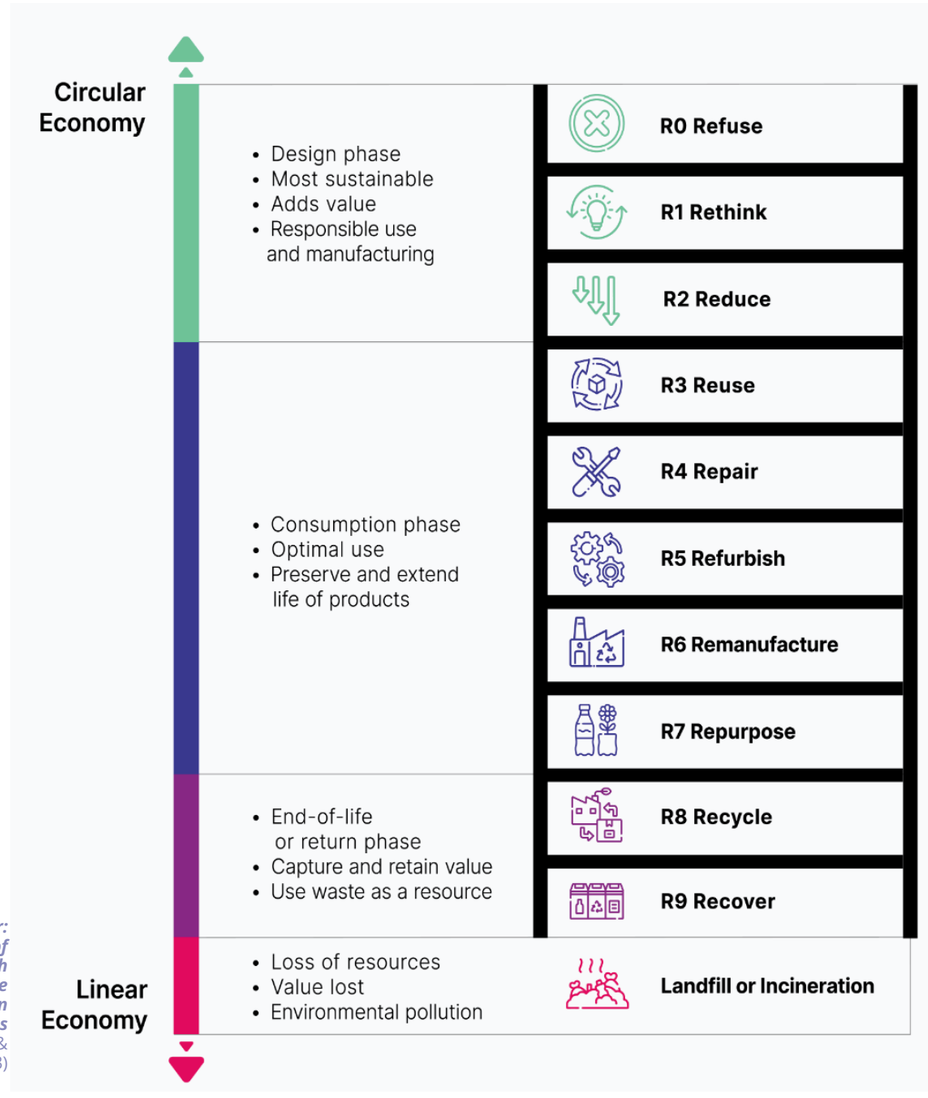


fig. 17 ***The R-ladder: hierarchy of R-strategies with their possible implementation phases*** source // Malooly & Daphne (2023)

a ‚care-full' approach to circularity

‚question[s] the idea of profitability as the most important principle, aiming to put non-monetary values first'

(Bono et al., 2024)

problem statement II

problem statement

The globalised textile industry exacerbates socio-ecological challenges such as climate change, the resource crisis and social injustice, driven by overconsumption and economic growth ambition.

The Dutch government and especially the municipality of Amsterdam have set themselves ambitious goals to address those challenges by achieving circularity among all economic sectors including the textile industry, while supporting the social foundation and respecting planetary boundaries (Ministerie van Algemene Zaken, 2023; Raworth et al., 2020).
However, current political and corporate circular textile initiatives are focusing on economic and technological parameters to close material cycles, by boosting recycling practices to loop textiles at their end-of-life phase (Calisto Friant et al., 2021). Due to this technocentric approach to circularity, current initiatives fail to address distributive challenges of the market that create both global and local social inequalities and a lack of social cohesion in local urban communities. Additionally, they do not tackle one of the fundamental causes to the challenges associated with the textile industry - the societal pattern of overconsumption (Bono et al., 2024). Amsterdam's circular transition operates 'within capitalist socio-spatial relations' (Savini, 2019; Thompson et al., 2024), reflected in spatial patterns that prioritize market spaces, whether they are part of the linear or circular textile industry as regular or second-hand stores, which remain highly accessible and focused on consumption. However, public non-market spaces that foster social circular experimentation and innovation are lacking, and convenient repair accessibility to counteract the consumption of new clothing remains insufficient.
In order to address the complex socio-ecological challenges related to the textile industry it is essential to put human and environmental well-being in the center of the circular transition by fostering inter-human and human-nature connections that care about maintaining and repairing our planet (Bono et al., 2024; Clube & Tennant, 2022; Genovese & Pansera, 2021; Jaeger-Erben et al., 2021; James, 2022). The task of spatial planning in this transition is to help facilitate spatial conditions for those 'care-full' (Bono et al., 2024) connections and practices with alternative spatial and management models.

However, the implementation of the concept of 'care-full' circularity faces two difficulties:

1. A lack of understanding of spatial demands encouraging and fostering social circularity.

2. The technocratic lens of circularity that leads to policies that do not address socio-spatial aspects of the transition.

research design & methods

III

research design & methods III

research questions & aims

main research question

How can spatial planning contribute to
*a **'care-full' circular transition** of the textile value chain*
in the Metropolitan Region Amsterdam?

sub-questions → ***aims***

// focus a: understanding the current system - identifying 'care-less' structures

- *What are the spatial and socio-ecological dimensions of existing 'care-less' (Bono et al., 2024) **circular practices in the textile value chain** taking place in the MRA?* → *To analyse and identify the shortcomings of current spatial and socio-ecological structures of the regional textile industry in regard to the ‚care-fullness' approach to circularity*

- *Where are **gaps** in the **policy and stakeholder system** from the lens of a 'care-full' circular transition?* → *To make policy recommendations and propose a stakeholder strategy that enables a 'care-full' circular textile transition.*

- *What are **existing 'care-full'** (Bono et al., 2024) circular practices that can inspire a **'care-full' circular textile value chain**?* → *To learn from existing local initiatives to inform spatial principles and socio-ecological requirements to foster a 'care-full' circular textile transition for the specific context of the MRA.*

// focus b: learning from existing 'care-full' & 'care-less' circular structures

- *What are spatial and socio-ecological strategies for a **'care-full' circular textile value chain**?* → *To define design interventions including spatial principles and socio-ecological requirements to foster a 'care-full' circular textile transition.*

// focus c: 'care-full' spatial implementation

- *How can **'care-full' circular practices** be **spatially facilitated** in the Metropolitan Region Amsterdam?* → *To explore how the design interventions can be implemented into the existing regional and urban landscape and how they can potentially influence socio-ecological conditions of the textile value chain.*

theoretical framework

The challenges related to the circular transition of the textile value chain in the MRA are rooted in the social and economic structures and values that drive production and consumption of textiles causing social injustice and ecological destruction on the local and global scale.

Using the theoretical concept of ‘care-full’ circularity (Bono et al., 2024) underpinned by the circular society concept (Calisto Friant et al., 2023), instead of the commonly applied circular economy, to analyse the complex textile value system, it becomes evident that achieving circularity extends beyond merely closing material loops. It highlights the importance of not only analysing and managing resource cycles, but also all other relevant socio-ecological cycles about political power structures, economic distribution of benefits and costs, knowledge and lastly, care work (Calisto Friant et al., 2023). Recognizing the full complexity of socio-ecological issues of the global textile value system associated with Amsterdam is essential for addressing human and environmental well-being. Based on the theoretical framework, interventions proposed in this thesis have the goal to enhance current circularity ambitions in the textile sector in the MRA with a degrowth mindset (Savini, 2023) and a focus on care (Bono et al., 2024) with the goal to imagine a socio-ecological textile system that encourages human and planetary well-being. The theory of system thinking (D. H. Meadows & Wright, 2011) helps to find leverage points - points in the regional textile system to intervene to induce transformational change (D. Meadows, 1999).

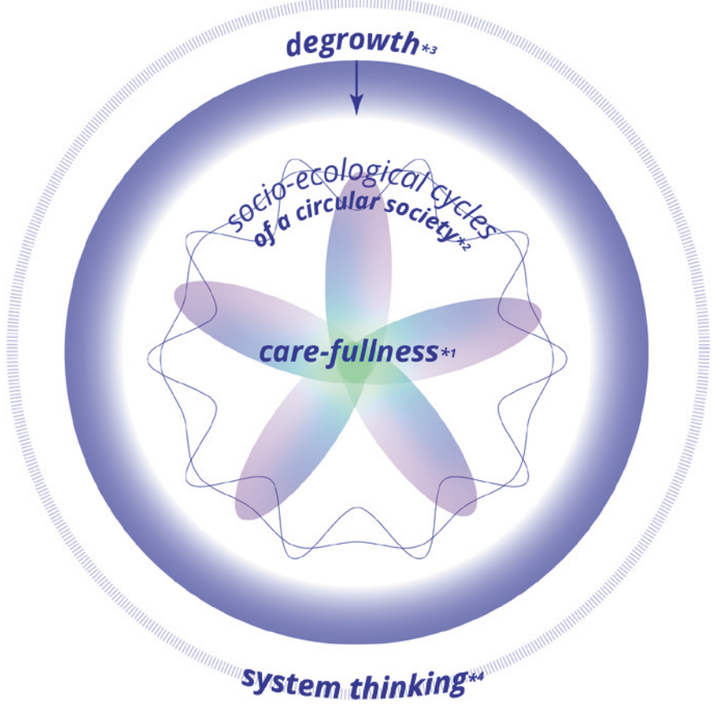
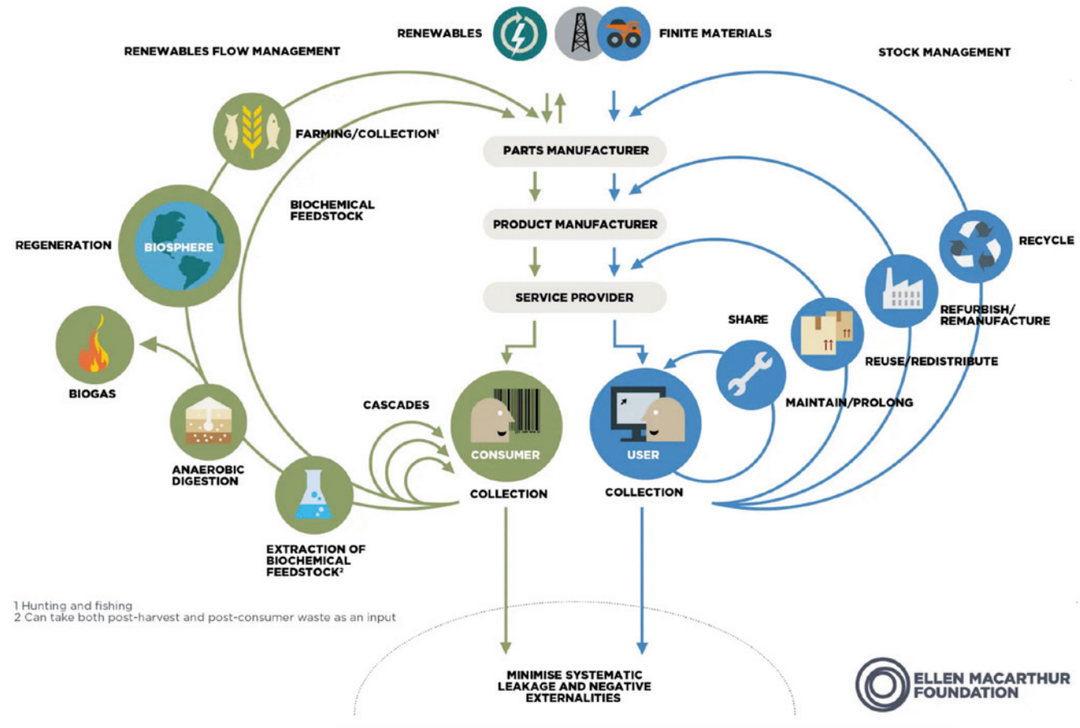


fig. 18 ***Theoretical framework***
source // author
*1 Bono et al. 2024
*2 Calisto Friant et al. 2022
*3 Raworth, 2017; Savini, 2023
*4 Meadows and Wright, 2011

fig. 19 ***Systems diagram of the Circular Economy***
source // Ellen MacArthur Foundation (2021)



Since policy papers and strategies analysed in this thesis mainly use the term and notion of the circular economy (CE), it will be explained briefly in the following to distinguish it from the circular society. The CE is a concept in the field of industrial sustainability that targets the elimination of waste (Ellen MacArthur Foundation, 2013, 2015; Ragossnig & Schneider, 2019) and the reduction of exhausting natural resources simultaneously by optimizing resource management in economic systems. This means looping materials that are already used within the economic system following the idea that “waste” can be considered as a resource by recycling, refurbishing or reusing the materials of a product at the end of its first use cycle (see fig. 22). In the textile industry this would mean, for example, collecting used clothes in donation containers, sorting and reselling those in second-hand stores. CE models are based on giving waste economic value (Lacy & Rutqvist, 2015), as it can be reinvested into the economic system. That is why critics, such as (Hepp, 2021; Lambert, 2021; Savini, 2023), describe the mainstream CE still as a capitalistic and growth-driven approach since the circular economy is thriving and dependent on underused resources that are wasted in a linear economy. They explain that CE practices ultimately increase production and consumption while still supporting a material-throughput-oriented economy. Furthermore, mainstream CE approaches fail to address key societal issues and cycles related to the distribution of benefits and costs, power over innovation and policies and the social and environmental impacts of the CE transition (Calisto Friant et al., 2023).

research design & methods III

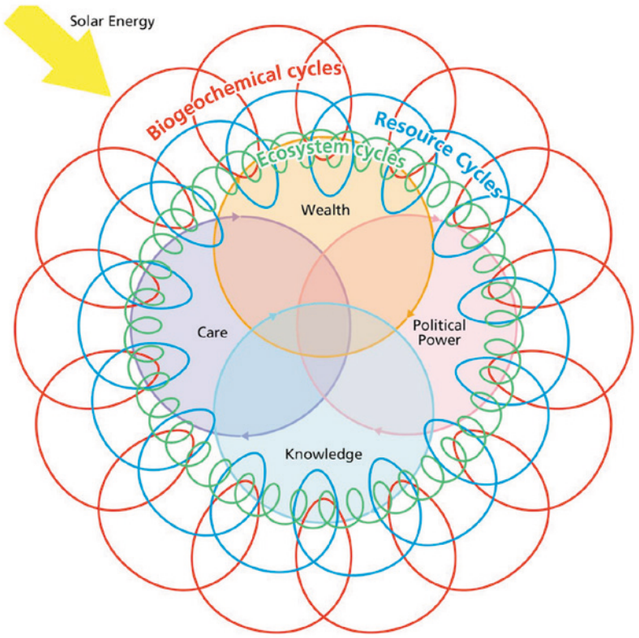


fig. 20 ***Socio-ecological cycles of a circular society***
source // Calisto Friant et al. (2022)

To respond to the shortages of the mainstream CE concept, Calisto Friant et al. (2022) put forward the more complex concept of the circular society. It advocates for a more wholesome understanding of the interrelation and balance of economic resource cycles with society and the natural environment. Therefore, seven socio-ecological cycles have been defined to be relevant (fig. 23):
1. biogeochemical cycles of the earth;
2. ecosystem cycles;
3. resource cycles of materials and energy;
4. political cycles of power;
5. economic cycles of wealth, capital, and money;
6. knowledge cycles of technology, information, and education;
7. social cycles of care.

The notion of care-full circularity also suggests expanding the technocentric approach of resource looping, by emphasising care and social justice for CE initiatives. This approach highlights the importance of non-monetary values and relationships in order to achieve social and environmental well-being within the circular transition. Therefore, Bono et al. (2024) propose to care about five aspects: carers, materials, space, time and difference in communities.

In this thesis, the aforementioned five care aspects will be key subjects for the analysis and design in regard to the textile system of the MRA with the goal of complementing and correcting current techno- and material-centric circular ambitions.
The theory behind the socio-ecological cycles of the circular society helps to enforce and expand those five aspects. First, to care for carers means recognising and rewarding the less obvious workforce that individuals and communities along the whole textile value chain invest to make circular resource flows happen (Bono et al., 2024).This is closely related to the socio-ecological cycles of political power (4) and economic distribution (5) (Calisto Friant et al., 2022). Governance and policy models determine the value of certain practices and jobs, as well as financial distribution and provision structures, which inherently influence social equality. Second, expanding the technocratic and efficient view of cycling materials with learning ‘from indigenous, informal, improvised, or everyday practices’ (Bono et al, 2024) is an opportunity to strengthen community cohesion. The ‘care-full’ lens on material cycles is about balancing resource cycles in the textile industry (3) with biogeochemical cycles of the earth (1) and ecosystem cycles (2), with support of local knowledge (6) and social cycles (7). Local community knowledge about regional sources for bio-based fibers, hand-crafting techniques and sharing models can support close and slow down resource loops in accordance with ecological demands, while enhancing community well-being. Third, the care for equal access to and the provision of spaces for social innovation, cultural improvisation and experimentation, free from market mechanisms, is crucial for a ‘care-full’ circular textile transition. The economic cycles of wealth, capital and money (5) directly influence spatial structures and development patterns in the city of Amsterdam. The cycle of political power (4) influences the aforementioned significantly. Fourth, caring for time aspects in the circular textile transition means on the one hand planning for convenient access to circular options such as repair cafés and clothing resale stores. On the other hand it refers to effective time horizons of policies and instruments. Furthermore, the lifetime of clothing and its trends is an influential factor on one of the basic strategies of circularity: slowing down loops to reduce resource use. This requires care and balance in the political (4) and social care cycles (7). Fifth, caring for differences in communities by encouraging diverse and collectively driven CE practices and opportunities that cater to multiple demands and conditions is essential to the ‘care-full’ approach to the CE. This aspect is closely related to the political (4) and social care cycles (7).

The theory on systems thinking delivers an approach to analyse the complex textile system on an organisational level to identify leverage points, which are places to intervene in the system that potentially entail transformational change (D. Meadows, 1999; D. H. Meadows & Wright, 2011). Meadows' introduces different levels of possible system intervention: shallow leverage points are parameters, such as such as taxes and subsidies usually targeted by policies and feedbacks, which have lower effectiveness to induce system wide change. Deep leverage points on the other hand are determined to effectively create widespread changes in the system. Those are connected to the design of social structures and institutions that regulate feedbacks and parameters and to the intentions behind the system, based on values, goals and world views of leading actors (Gisladottir et al., 2022).
The theoretical approach of systems thinking suggests intervening at deeper leverage points to drive transformational change in the future. Based on that, this thesis concentrates on analysing and designing interventions at the 'intent' and 'design' scale (see fig. 24) (Gisladottir et al., 2022), where current social structures and institutions underlying values and ambitions block a 'care-full' circular transition. Those can mainly be influenced by leveraging balance in the political power, economic distribution, knowledge and social care cycles (4-7).

Forrester (1971) defined economic growth as a critical leverage point for addressing major global problems such as social injustice, resource depletion, environmental destruction. However, while economic growth has been continuously used as a tool to solve these issues, it paradoxically perpetuates the very same phenomena. In contrast, a degrowth approach to circularity proposes a radical shift in societal and institutional values toward materials and waste, as well as in the social and economic structures of production and consumption. Similar to the theories of the 'care-full circular economy' (Bono et al., 2024) and the circular society (Calisto Friant et al., 2023), degrowth critiques the capitalist and technocentric focus of the circular economy concept.
A degrowth mindset seeks to shift responsibility for waste management from individuals and corporations to collective and bio-regionalised systems of accountability and therefore redefines the value of waste from monetary to socio-ecological (Savini, 2023).
Sufficiency, as a key principle within degrowth and circularity, emphasizes doing and consuming less in a mindful way to reduce resource use and environmental pressures. This principle complements the degrowth approach by shifting societal focus from the pursuit of limitless consumption to embracing limits and prioritizing needs over excess. Sufficiency challenges the structures of overproduction and overconsumption by promoting more equitable resource distribution and encouraging systemic changes that align production and consumption with ecological boundaries (Buch-Hansen & Nesterova, 2023).Together with Raworth's doughnut economics framework, which advocates for agnosticism toward economic growth, sufficiency redirects the focus from economic expansion to achieving social prosperity within ecological limits (Raworth, 2018). This combined approach seeks to establish systems that prioritize human and environmental well-being over material accumulation.

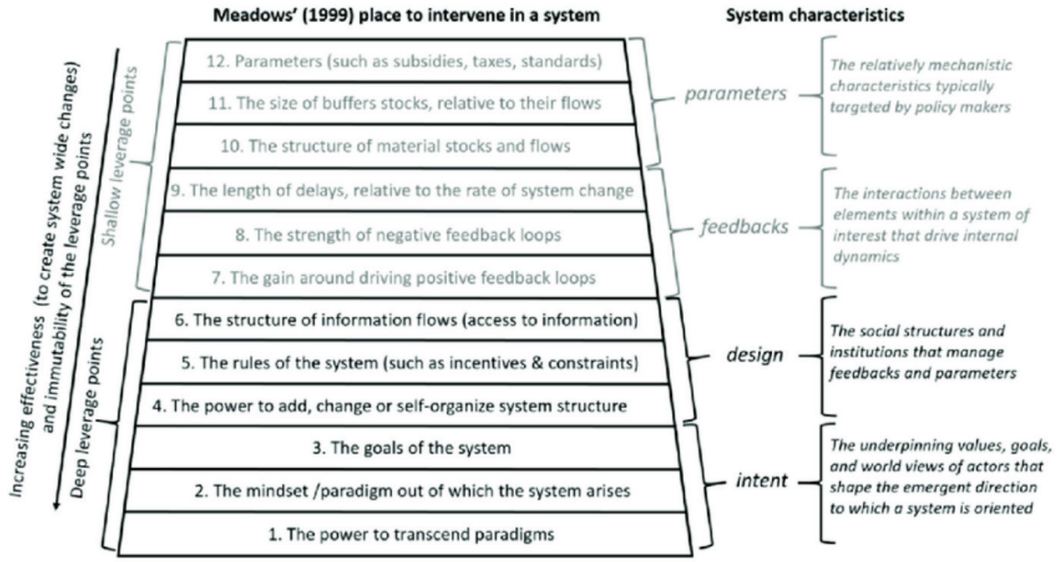


fig. 21 ***Scheme of leverage points***
source // Gisladottir et al. (2022)

the care flower
in a theoretical framework

The flower is used as a symbol for the ‚care-full' transition towards a circular society - it needs care and time and space to grow; a diversity of resources; and caretakers to protect and nourish it (fig. 22).

The five main pedals resemble the main aspects that need to be cared for in order for the circular society to flourish - and the flower to bloom. Space, time, difference in communities, carers, and materials need to be handled with care. They are derived from the ‚care-full' circularity theory (Bono et al., 2024). Based on that, these five aspects are the key areas of analysis and intervention in this project.
The socio-ecological cycles for resources, wealth, power, knowledge and care (Calisto Friant et al., 2022) make up the environmental conditions in which the flower / society lives. If the cycles are attuned to the needs of the flower, it blooms, and if they are not it wilts. As is the circular society.
The pollen resemble the patterns that suggest ‚care-full' interventions for the five main aspects: space, time, difference, carers, and materials. The pollen carry the DNA of the flower to reproduce it - similarly the patterns carry the essential ideas and research results from theory, analysis, and field work to produce a design for the Metropolitan Region of Amsterdam to become a ‚care-full' circular society.
Over the last decades the flower was boosted to unnatural growth overstepping it's habitual capacities. As a result, the resources from what it lives off are getting scarce. To avoid the flower from struggling, the degrowth mindset (Savini, 2023) suggests not to apply artificial measures to boost the flower's growth anymore. Therefore, through spatial interventions, the conditions of it's natural habitat are created; and with shifts in values and responsibilities resources are smartly redistributed and utilised by its caretakers to repair and maintain the flower.

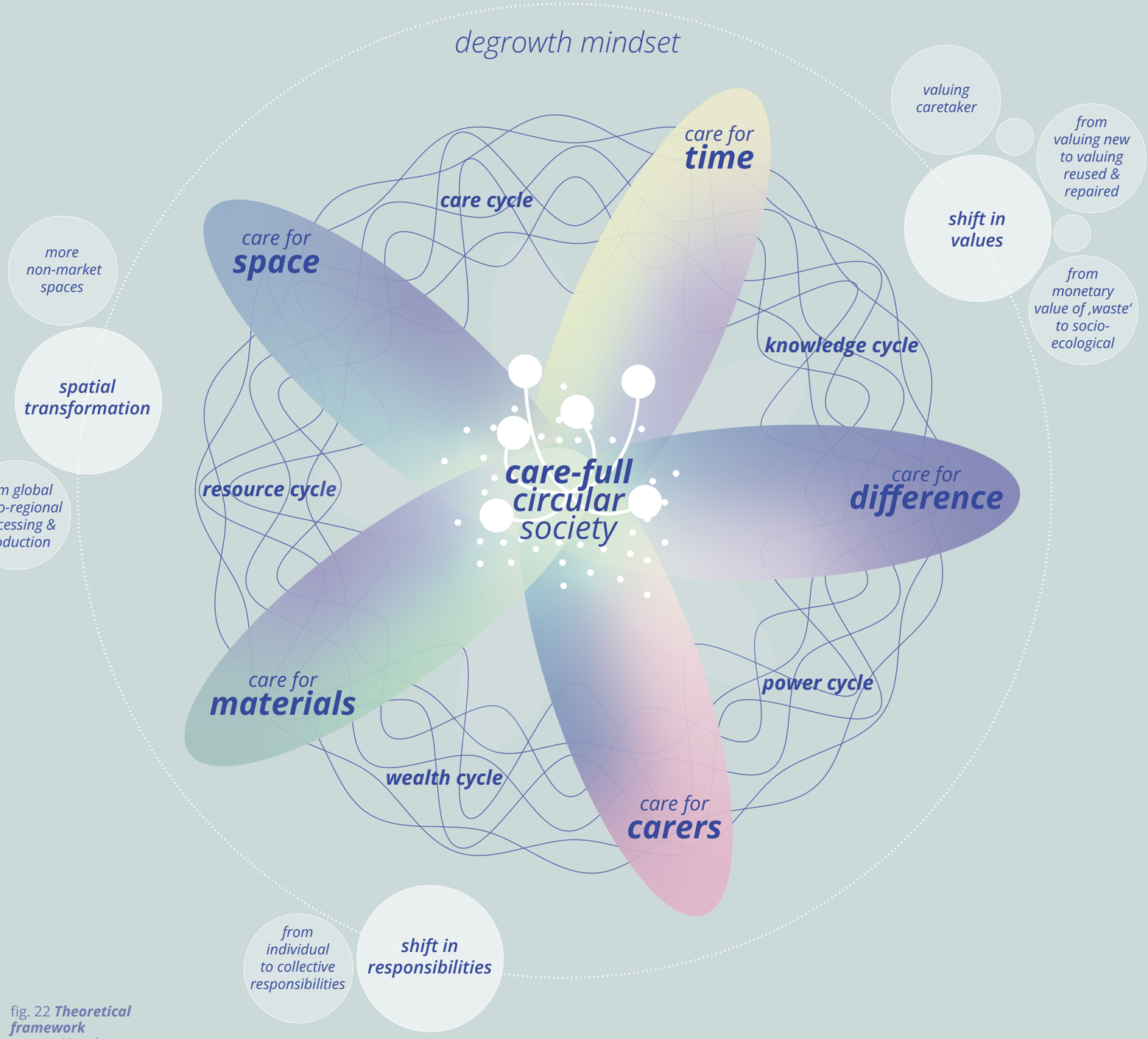


fig. 22 ***Theoretical framework***
source // author

the care flower
in a conceptual framework

In order to operationalise the theoretical framework the care flower proposes, this conceptual framework (fig. 23) was developed.

The five care aspects - materials, space, time, difference, and carer (Bono et al, 2024) - provide a critical framework for analysing circular textile value chains across neighbourhood, city, and regional scales. To operationalise these aspects, the following six key dimensions need to be addressed:

- functions & transport infrastructure: integration of circular textile activities with mobility networks.
- qualities: visibility, accessibility, and inclusivity of spaces for circular textile functions.
- context: alignment with local socio-economic, spatial, and ecological conditions.
- use: flexibility in space utilisation.
- ownership: community-led governance or public-private partnerships.
- financing: equitable funding mechanisms to sustain ‚care-full' initiatives.

This can be done by strategically aligning the spatial planning tools of spatial design, governance, and policy. Important emerging concepts and shifts inform interventions proposed with these three tools, ensuring social justice, community well-being, and environmental resilience. Savini (2023) argues for a shift from global to bio-regional (waste)economies; Williams (2021) highlights the importance of moving away from inflexible to adaptable systems to strengthen community resilience; transitioning from urban sprawl to net-zero soil artificialisation is a global spatial planning movement; Egger et al. (2024) propose to change from centralised to circular commoning infrastructures, Beveridge & Koch (2024) emphasise the significance of democracy of agency; and finally Savini (2023) argues to move away from a focus on monetary to systemic and socio-ecological values for degrowth circularity. All these layers of analysis and design result in ‚care-full' patterns - interventions that are interconnected and context-based for designing a cross-scalar vision and strategy for the textile system in the Metropolitan Region of Amsterdam.

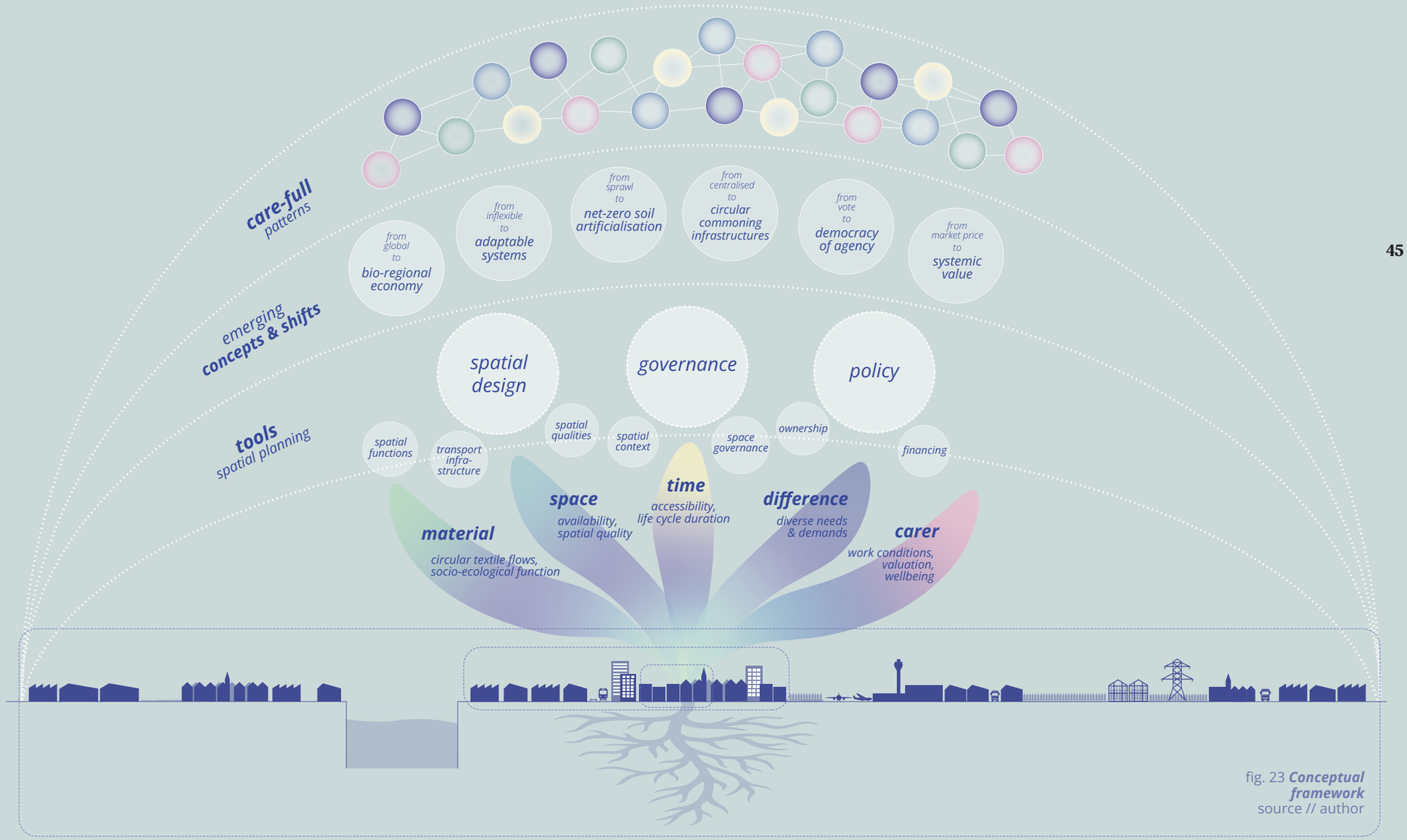
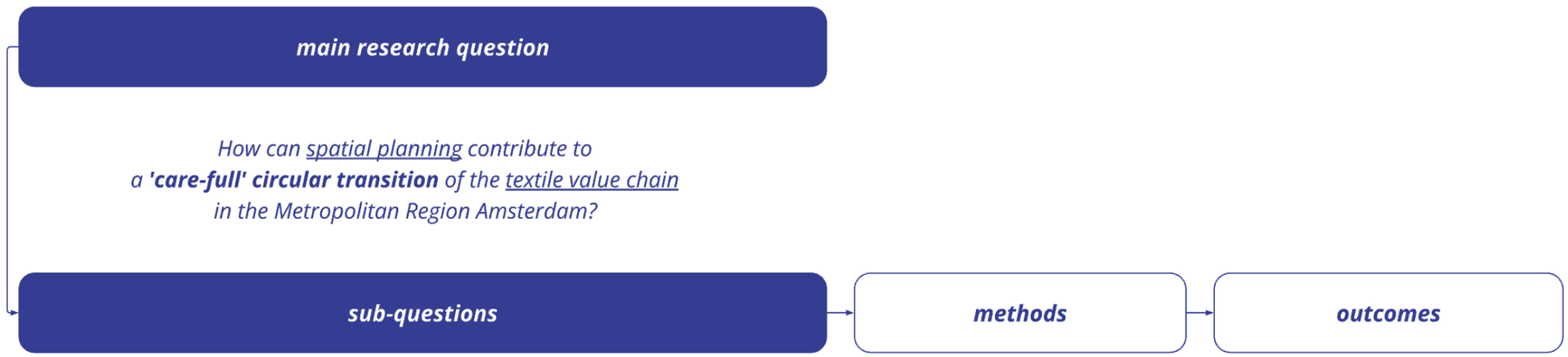


fig. 23 ***Conceptual framework***
source // author

analytical framework



// focus a: understanding the current system - identifying 'care-less' structures

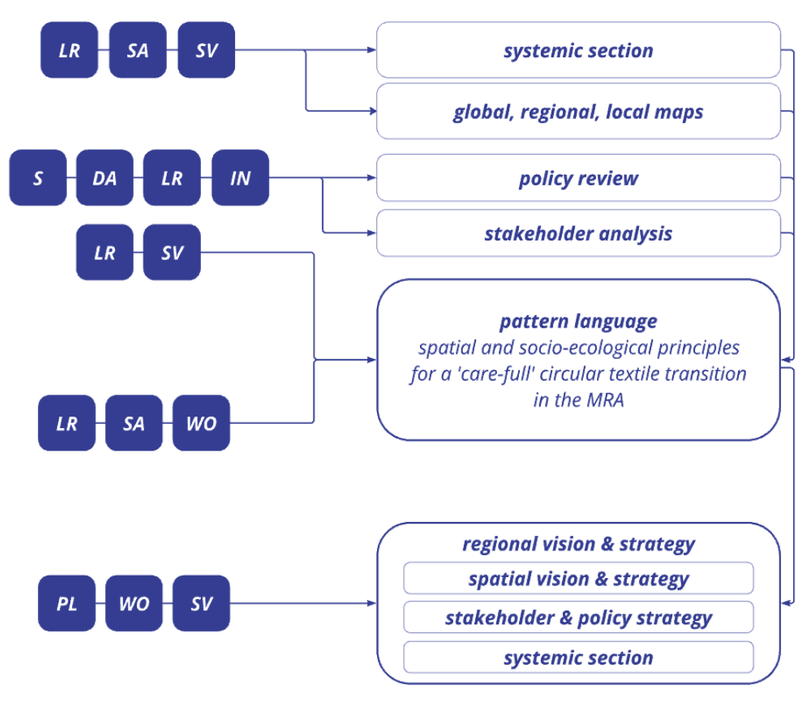
- *What are the spatial and socio-ecological dimensions of existing 'care-less' (Bono et al., 2024) **circular practices in the textile value chain** taking place in the MRA?*
- *Where are **gaps** in the **policy and stakeholder system** from the lens of a 'care-full' circular transition?*
- *What are **existing 'care-full'** (Bono et al., 2024) circular practices that can inspire a **'care-full' circular textile value chain**?*

// focus b: learning from existing 'care-full' & 'care-less' circular structures

- *What are spatial and socio-ecological potentials for a **'care-full' circular textile value chain**?*

// focus c: 'care-full' spatial implementation

- *How can **'care-full' circular practices** be **spatially facilitated** in the Metropolitan Region Amsterdam?*



methods legend:

- **SA** *spatial mapping*
- **S** *stakeholder analysis*
- **LR** *literature review*
- **DA** *thematic document analysis*
- **SV** *site visit, including interviews, observations*
- **PL** *pattern language*

methods explained

SA

Spatial analysis

Goal

- understanding spatial relations of the textile value chain at the regional and local scale

Process

- analysis: spatial types related to the linear and circular textile value chain and their distribution within the region and city
- design: exploring spatial impact of design interventions with the goal of developing spatial typologies for circular tetxile function

LR

Literature review

Goal

- gathering and analysing existing research findings on material flows, socio-ecological challenges and policies

Process

- 1. keyword search, 2. scanning for relevance, 3. deep reading and collection of information

S

Stakeholder analysis

Goal

- overview over roles and positions of actors and stakeholders involved in the textile value chain

Process

- collecting relevant actors and stakeholders throughout desk research
- mapping, grouping and relating actors and stakeholders regarding their power and interest

DA

Thematic document analysis

Goal

- determining governmental goals, restrictions and strategies towards the circular (textile) transition

Process

- 1. assigning codes to relevant keywords (e.g. recycling), 2. grouping similar codes, 3. creating higher level concepts, 4. interpretation of those concepts

SV

Site visit

Goal

- meeting relevant actors and analysing spatial structures

Process

- 1. based on spatial mapping from desk research relevant locations are picked and visited, 2. documentation via photographs and audio-recordings

PL

Pattern language

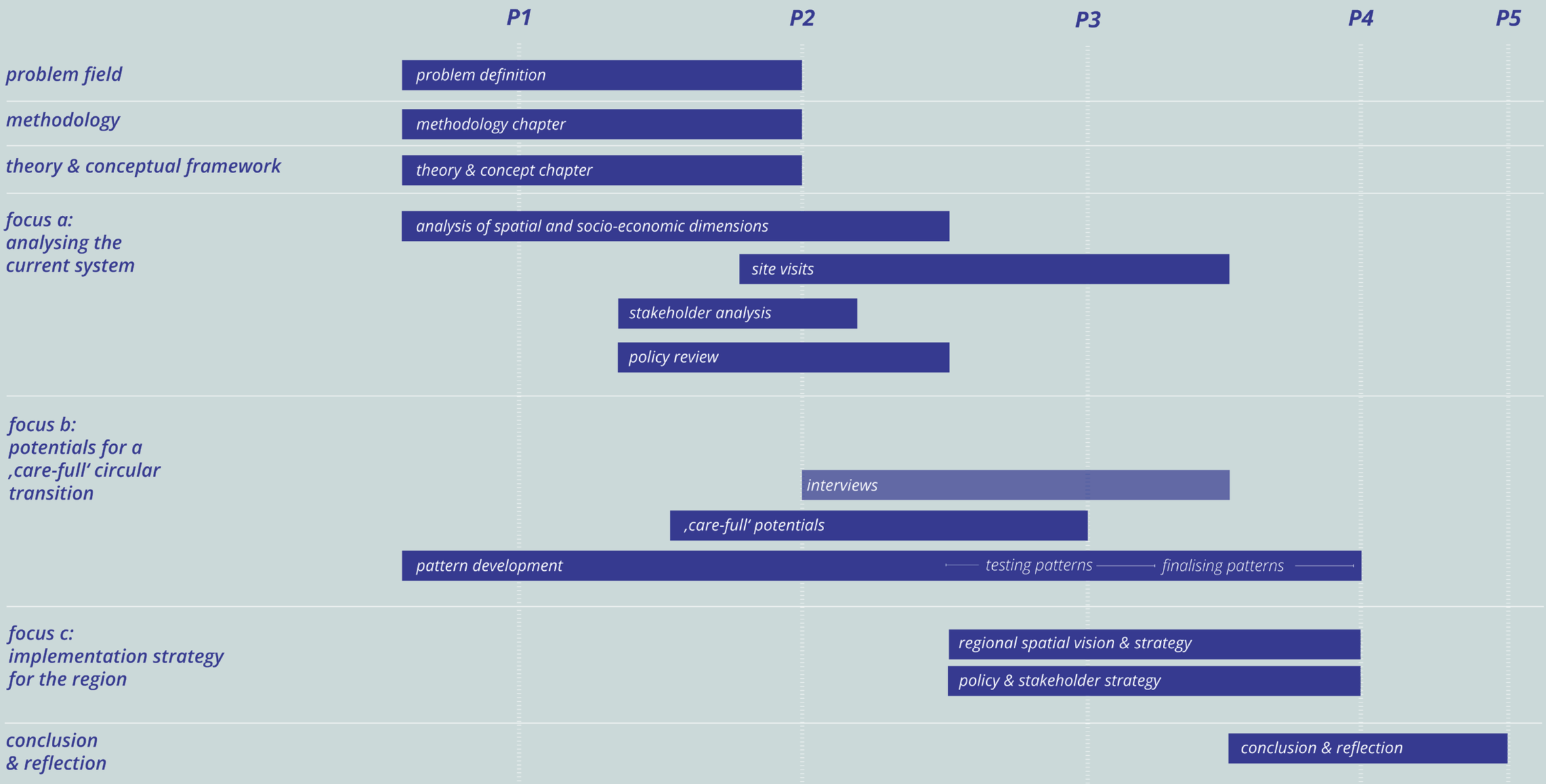
Goal

- bridging research and design by creating patterns of potential interventions

Process

- 1. patterns are created in an itinerative process based on research findings, 2. pattern review in interviews, 3. used as communication and design tool with stakeholders

timeline


P1
P2
P3
P4
P5
problem field
problem definition
methodology
methodology chapter
theory & conceptual framework
theory & concept chapter
focus a:
analysing the
current system
analysis of spatial and socio-economic dimensions
site visits
stakeholder analysis
policy review
focus b:
potentials for a
‚care-full' circular
transition
interviews
‚care-full' potentials
pattern development
testing patterns
finalising patterns
focus c:
implementation strategy
for the region
regional spatial vision & strategy
policy & stakeholder strategy
conclusion
& reflection
conclusion & reflection

the current textile landscape

IV

What are the spatial and socio-ecological dimensions of existing ‚care-less' circular practices of the textile value chain taking place in the MRA?

This chapter aims to analyse and identify the shortcomings of current spatial and socio-ecological structures of the textile industry in regard to the ‚care-fullness' approach to circularity. Therefore, it is structured according to the five aspects that are key for a ‚care-full' circular textile transition: care for carers, materials, space, time and difference.
The results of this chapter will be used to identify potential strategies and locations to intervene.

care for carers?

This section examines who works along the Dutch textile value chain and who is has stakes in the circular transition of the sector.

who works along the Dutch textile value chain?

Both Dutch textile value chains - the circular and the linear one - create a wide spectrum of jobs and employs many different workers, ranging from low-skilled to highly-skilled roles. At the entry level, low-skilled positions include warehouse staff, textile sorters, collection drivers, and retail sales assistants, who are essential for logistics, textile collection, and store operations. Mid-skilled roles are machine operators, quality controllers, tailors, repair technicians, and logistics planners, supporting textile processing, repair, and distribution processes. Highly-skilled professionals include engineers, sustainability experts, R&D specialists, and policy advisors, who drive innovation and strategic industry transformation. Transitioning towards a fully circular value chain by 2050 would mean that new skills and knowledge in recycling and clothing manufacturing would be needed.

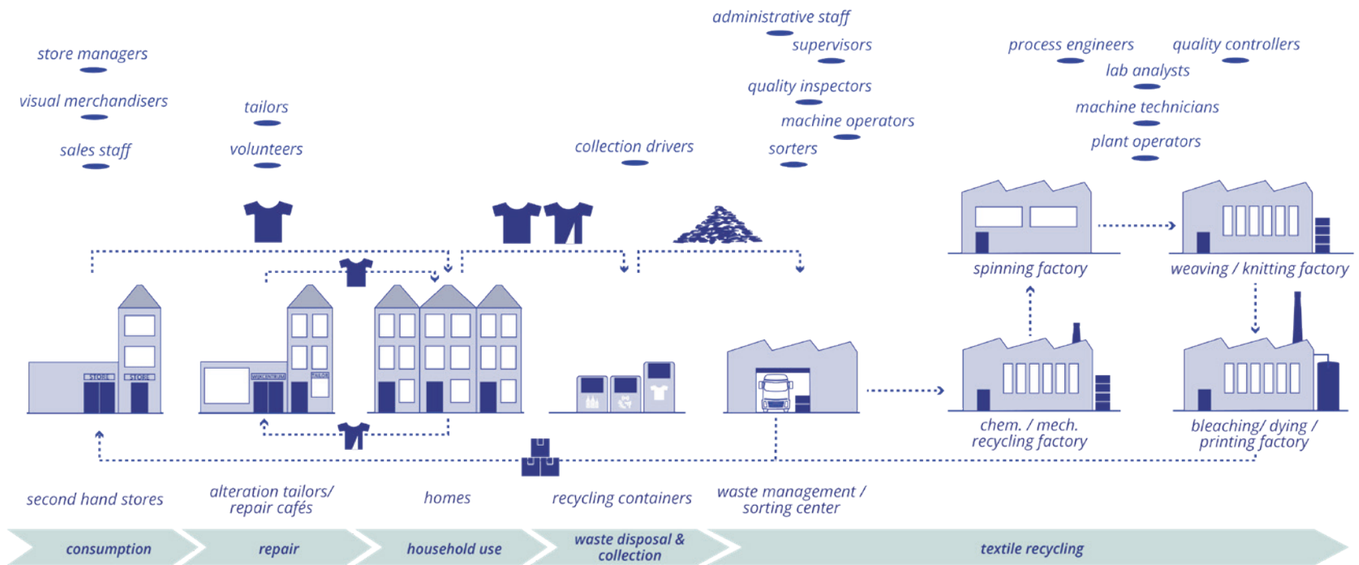


fig. 24 ***Spatial types of circular textile functions & carers along the Dutch part of the apparel value chain***
source // author

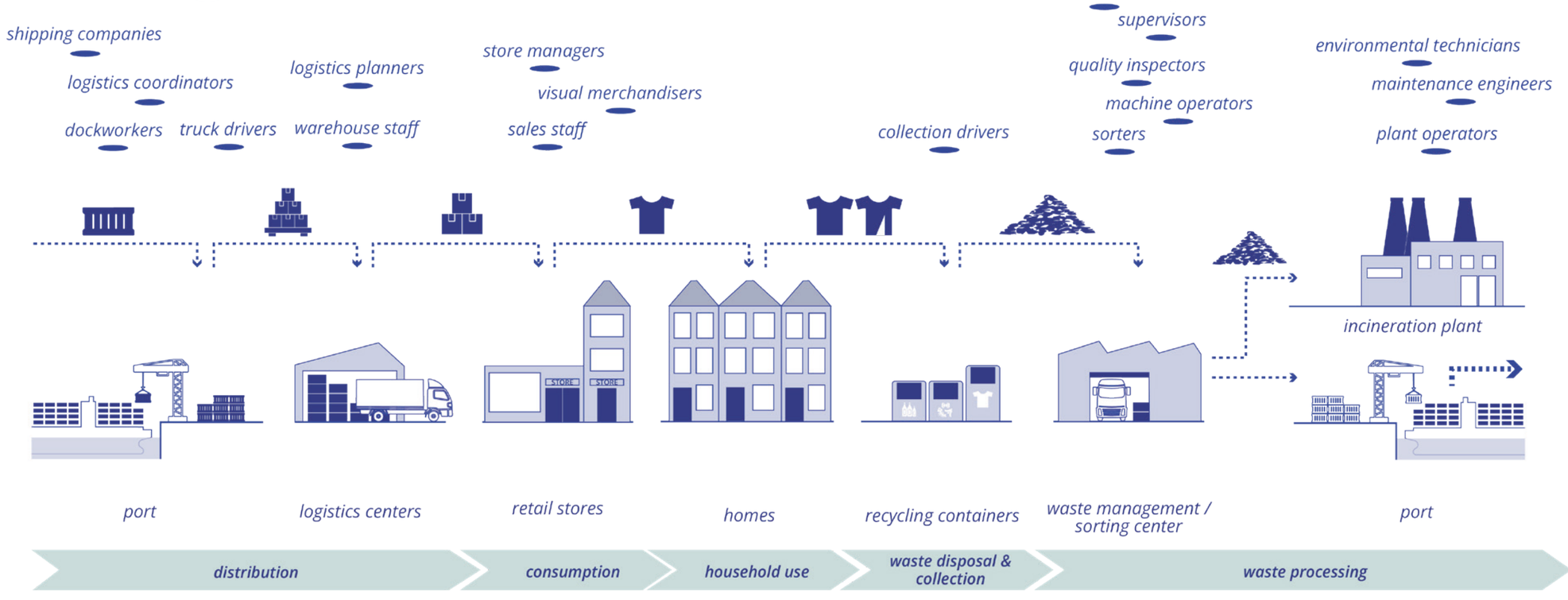


fig. 25 ***Spatial types of linear textile functions & carers along the Dutch part of the apparel value chain***
source // author

who works in circular jobs?

One key aspect of the ‚care-fullness' approach to circularity is to value and support the people without whom circularity would not be possible (Bono et al., 2024).

Current circular practices in the apparel value chain depend on workers that collect, sort, resell, recycle or repair used clothing.
In assessing whether these circular workers are being cared for, Suarez et al. (2022) suggest assessing job quality, livelihood sustainability and gender equality and inclusion (fig. 26).
In their research they found that in the Dutch apparel value chain circular practices such as repair, resale, rental and recycling generate few quality jobs and that more vulnerable population groups work in informal and lowest paid jobs (L. J. Suarez-Visbal et al., 2023).
Circular employment in the sector is characterised by minimum wages, temporary contracts and part-time working models. There is a gender inclusion gap in most areas of work, with women being paid less than men and having more part-time contracts. In the garment repair sector, a majority of jobs are held by male immigrants at or around the minimum wage. Additionally, popular resale and repair initiatives in the Netherlands such as Kringloopwinkels and repair cafés, rely on unpaid volunteers (L. J. Suarez-Visbal et al., 2023).
If we zoom out to the global scale of the circular apparel value chain, we have to acknowledge that the Netherlands exports unsorted and used clothing and still relies on sorted clothing deliveries that are being imported back from countries of the Global South – e.g. India is known to be the 'recycling hub' (Circle Economy, 2023). This shifts jobs for sorting and recycling abroad, where the Dutch government and companies have no influence on securing decent work conditions (Circle Economy, 2023).

fig. 26 ***Evaluation of gender inclusion in the Dutch textile value chain***
source // Suarez et al. (2022)

who cares about circularity?

Understanding current power and interest relations in the stakeholder system of the circular transition can reveal potential leverage points for a more ‚care-full' transition.

When mapping the stakeholders of the circular textile transition and their power and interest in a ‚care-full' transition, they can be divided into three groups (fig. 27). There is the group of caretakers - the individuals, communities and organisations that take action to drive the ‚care-full' circular transition. Care takers include the circular workers and volunteers mentioned above, as well as private companies and non-governmental organisations (NGOs). Their power is generally low to moderate, but their involvement shows a high level of interest. The second group - the caregivers - is mostly public institutions with high power and relatively high interest in the transition. They are able to give or distribute power and incentives among stakeholders and therefore, to steer transformation in desirable directions. It is argued that actual decision-making power over policy is very much centralized within the municipal departments that control urban and economic development, which often leads to prioritising economic interests (Thompson et al., 2024).
The third group – the non-carers – consists of businesses that still follow a linear and profit-oriented approach and traditional consumers. They have low interest and moderate power to turn the current system around. Therefore, potential strategies to shift power and interests in a favourable 'care-full' direction could evolve around raising awareness and involving non-carers more and supporting caretakers in their actions.

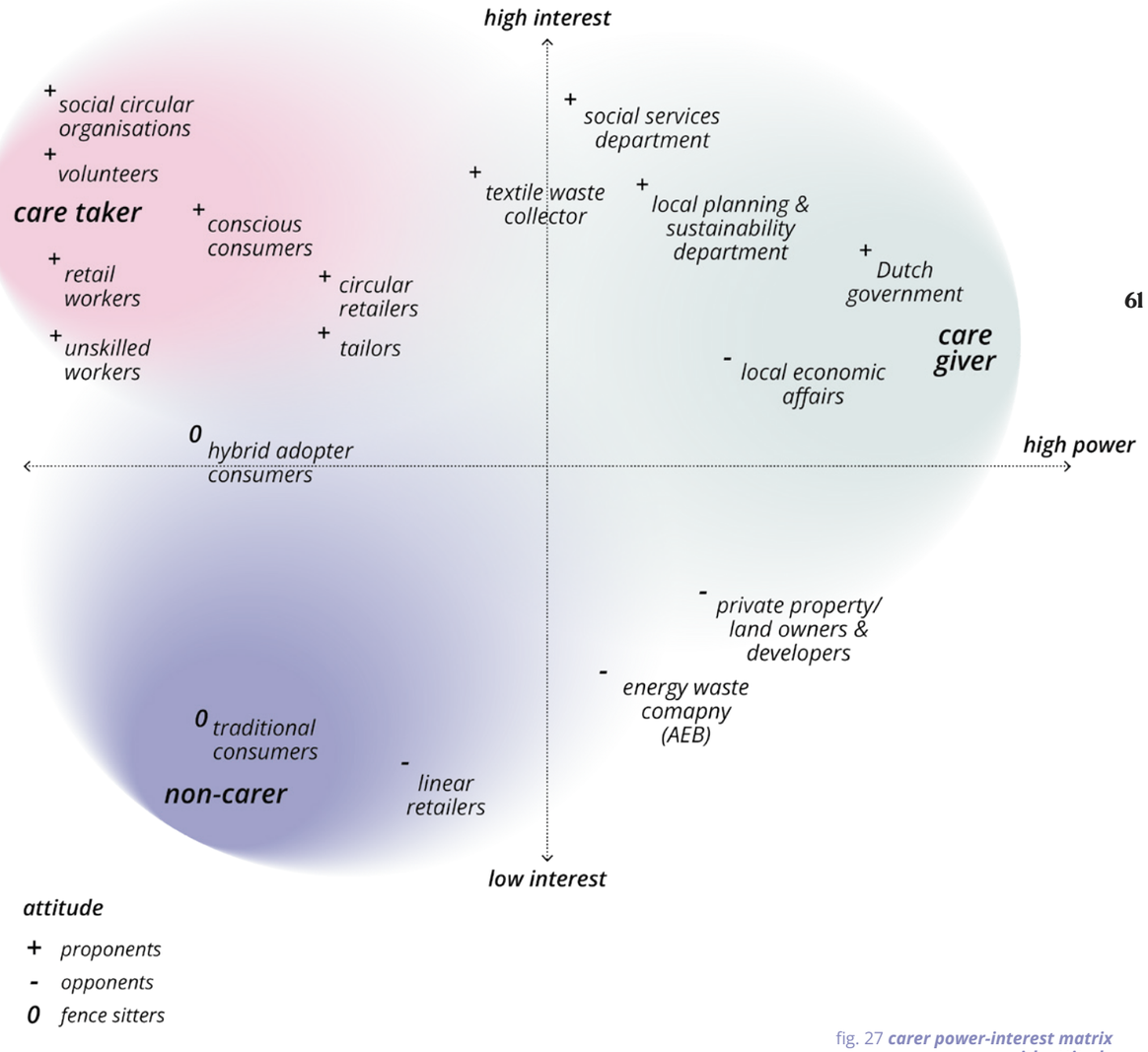


fig. 27 ***carer power-interest matrix with attitude***
source // author

care for materials?

This section analyses textile material flows in the MRA in order to understand how materials are valued and cared for.

care for materials?
along the textile value chain going through the Netherlands

In order to achieve ‚care-full' material loops, first it is important to understand the flows (fig. 28), actions and associated impacts along the whole value chain (fig 29).

A care-full study of the first part of the textile value chain - the production and consumption - shows that there is little care for

- the environmental impact of the production and consumption of textiles (see Fig. 30): clothes are overproduced, Dutch consumers mainly buy imported clothes and prefer materials, such as cotton and polyester with a negative environmental and social impact (Xu et al., 2022)

... while also acknowledging that there is care for

- 5 % recycled materials, the percentage of clothing made from recycled materials has increased by 4% since 2018
- increasingly responsible purchasing choices: the resale sector is growing in the Netherlands

political goal with 5% of garments entering the Dutch market consisting of recycled materials, the Netherlands is far from achieving the political goal of 30% circular textiles by 2030

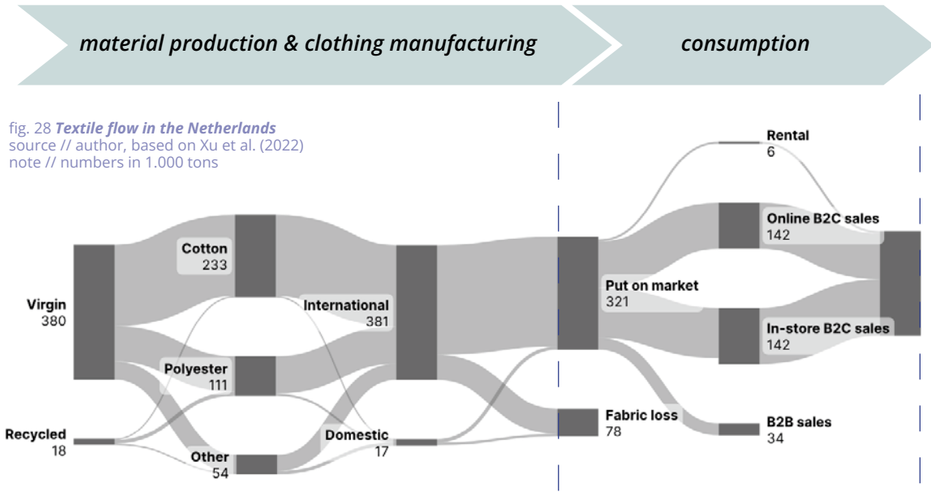


fig. 28 ***Textile flow in the Netherlands***
source // author, based on Xu et al. (2022)
note // numbers in 1.000 tons

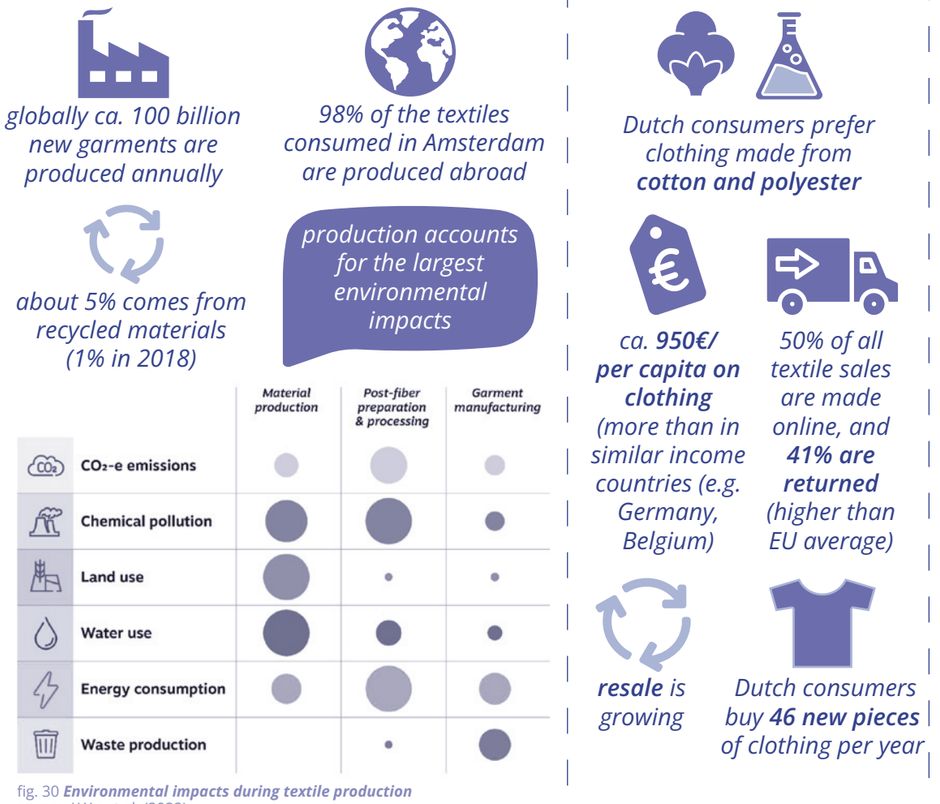


fig. 29 ***Material flows, actions and impacts along the value chain part I***
source // author based on Amsterdam Economic Board (2022); Xu et al. (2022); Maldini et al. (2017); thenounproject (n.d.)

fig. 30 ***Environmental impacts during textile production***
source // Xu et al. (2022)

care for materials?

along the textile value chain going through the Netherlands

A ‚care-full' study of the second part of the textile value chain - the use, waste disposal, collection and processing - shows that there is little care for

- responsible clothing use by Dutch consumers: the percentage of clothing that is sent to repair and maintenance is minor (Xu et al., 2022); furthermore, on average, consumers throw away almost as much clothing in a year as they buy (40 vs. 46) (Maldini et al., 2017)
- conscious disposal of textile waste and used clothes by Dutch consumers: in Amsterdam almost 70% of discarded textiles end up in residual waste, that is ultimately being incinerated (Amsterdam Economic Board, 2022)
- keeping the highest value of used clothing by sorting, reusing or recycling them properly by utilising the sorting capacity of the Dutch sorting sector, instead of exporting or incinerating valuable textiles

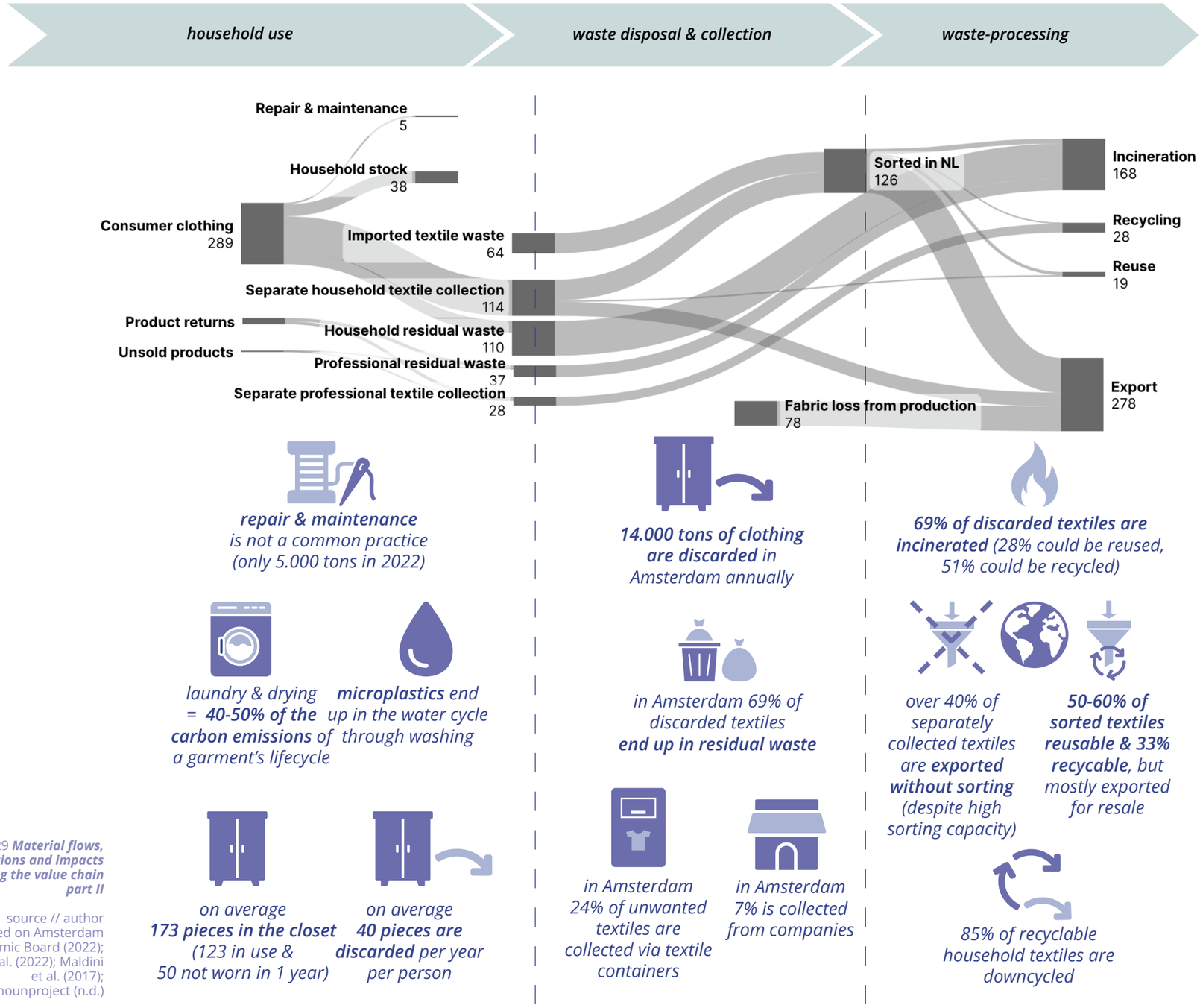


fig. 29 ***Material flows, actions and impacts along the value chain part II***

source // author based on Amsterdam Economic Board (2022); Xu et al. (2022); Maldini et al. (2017); thenounproject (n.d.)

care for materials? IV

care for materials?
- a Dutch closet inventory

This graphic visualises the amount of clothing average consumers in the Netherlands buy, posess, wear and throw out annually. They ...

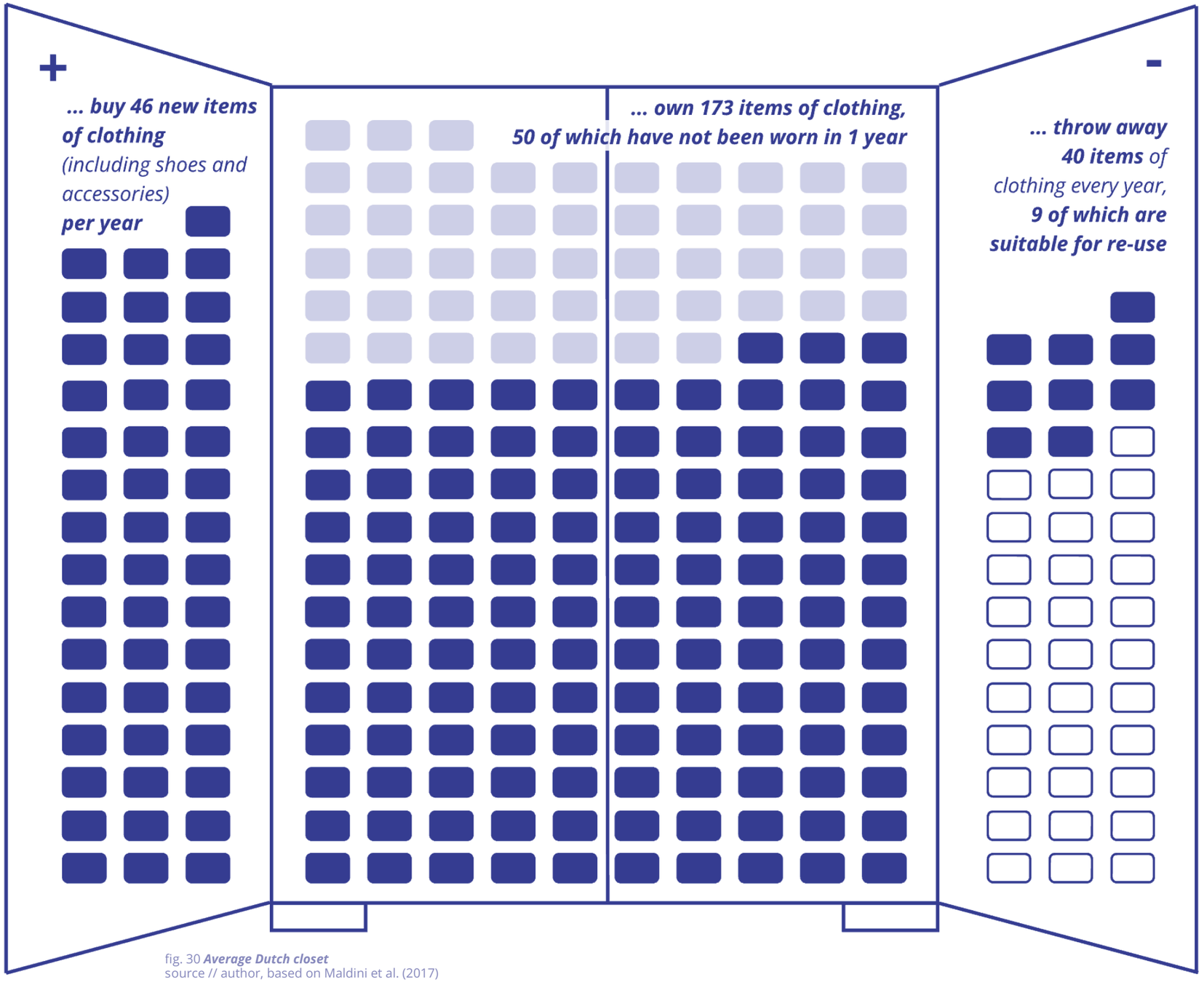


fig. 30 ***Average Dutch closet***
source // author, based on Maldini et al. (2017)

care for space?

This section analyses spatial qualities, typologies and locations of facilities relating to the textile value chain in the MRA in order to understand how ‚care-full' spatial patterns are.

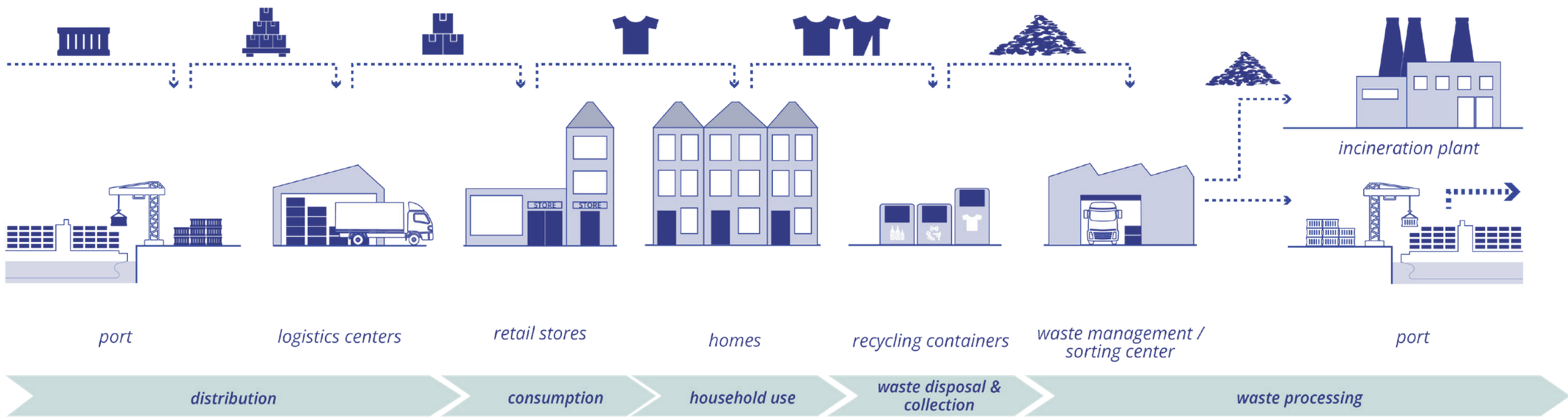
care for space?
along the apparel value chain

This section analyses where and how material flows and circular activities are distributed in the Metropolitan Region and the city of Amsterdam. This means mapping the facilities and infrastructures that enable the distribution, consumption and end-of-life flows of textiles. The aim is to identify gaps and potentials in current dominant spatial patterns that provide spaces for social circular innovation, improvisation and experimentation (Bono et al., 2024).

As shown in the previous section ‚care for materials', material flows of textiles on the territory of the Metropolitan region Amsterdam are predomnantly linear. Figure 32 shows the spatial types limited to types of places or units that process the linear flows of textile materials, whereas fig. 31 shows the spatial types that facilitate circular flows of textiles. The following pages give insight about the location of those types on the city, regional, national and international scale.

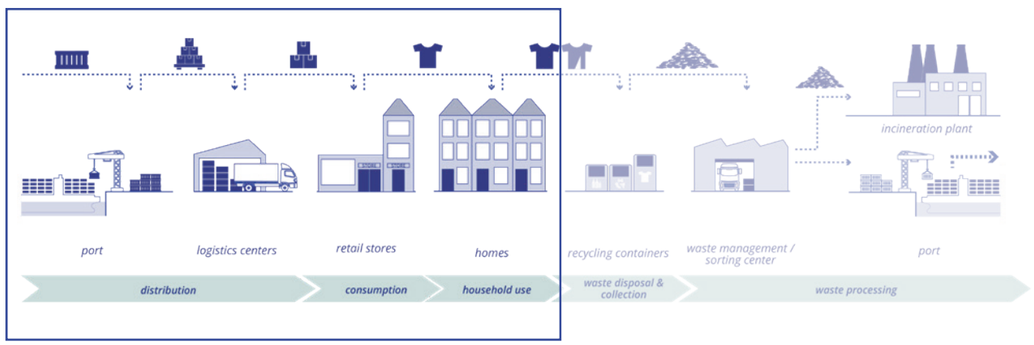
fig. 31 ***Spatial types of circular textile functions along the Dutch part of the textile value chain***
source // author

fig. 32 ***Spatial types of linear textile functions along the Dutch part of the tetxile value chain***
source // author



distribution & retail

The part of the clothing value chain that is located on Dutch territory often starts at the harbour of Amsterdam. Figure 33 shows that the distrbutional network along roads is the most dense around the harbour and the city of Amsterdam highlighting the orientation towards globalised value chains in general, not only for garments. The second map (fig. 34) shows the footprint of retail stores in the city. They mainly concentrate in the inner city, as well as along main axes outwards. Additionally, there are some big retail structures, Shopping centers, located in outer districts. The retail network is relatively widespread across the city, covering mixed neighbourhoods in the inner city as well as mostly residential districts promoting consumption with convenient accessibility.



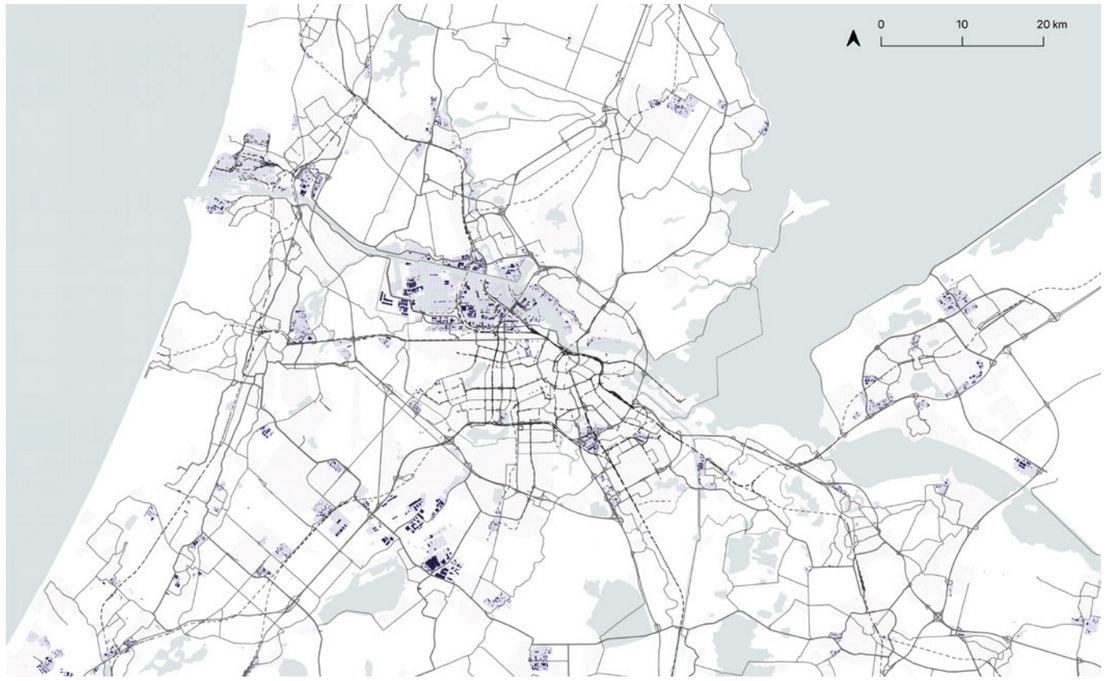


fig. 33 ***Network of distribution infrastructure***
source // author, data based on OSM and Nefs (2023)

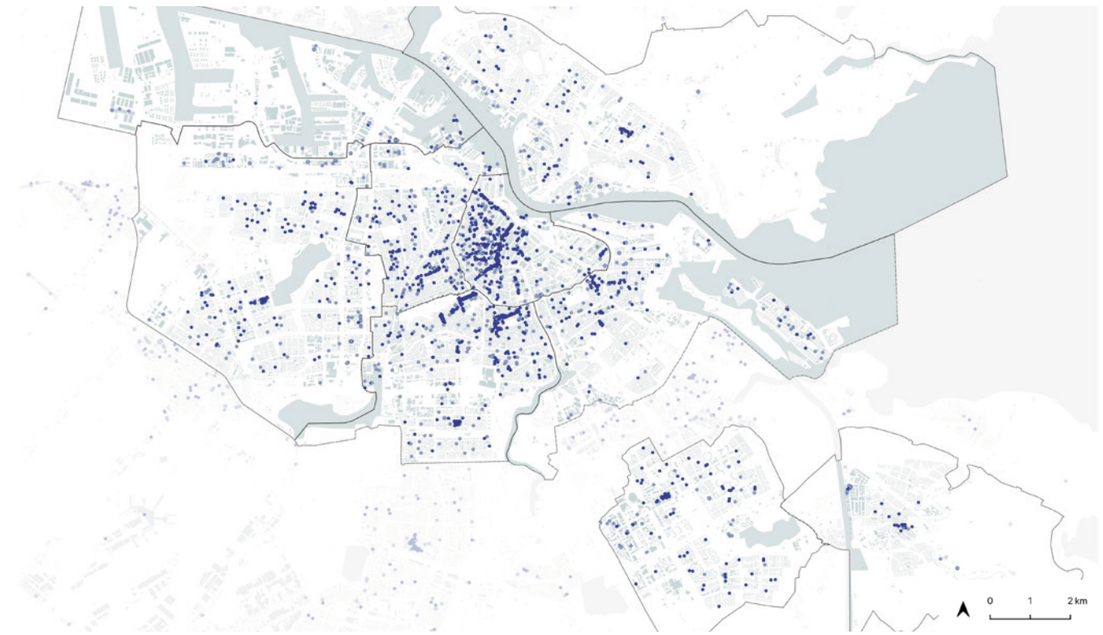
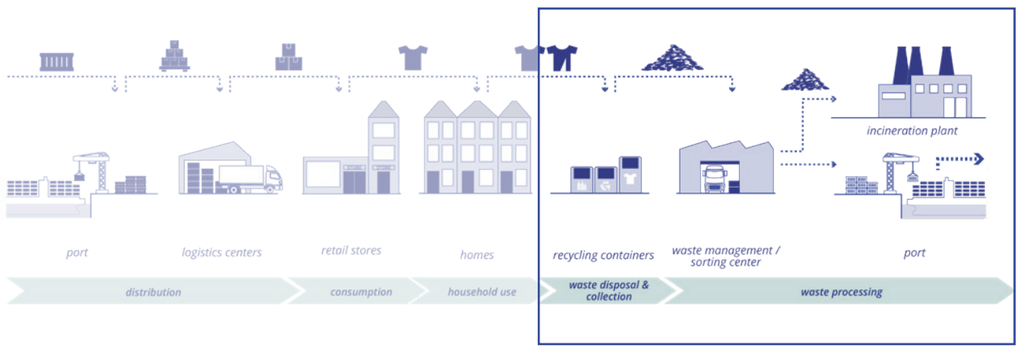


fig. 34 ***Retail stores & wholesales***
source // author, data based on Municipality of Amsterdam (n.d.) and OSM

places for disposal

Each year, Amsterdammers throw away 14,000 tonnes of textiles, which either end up in residual waste containers or as donations in resale stores or textile collection containers (fig. 36). The next step for the textile waste is waste management plants, which are strategically located near the harbour, as a big part of textiles is being exported to countries in the Global South (fig. 35) (Circle Economy, 2023).
Figure 36 shows a lack of textile collection containers in the inner city. Furthermore, there is no local wide-spread, small-scale waste processing network that could be lead and used collectively by communities.



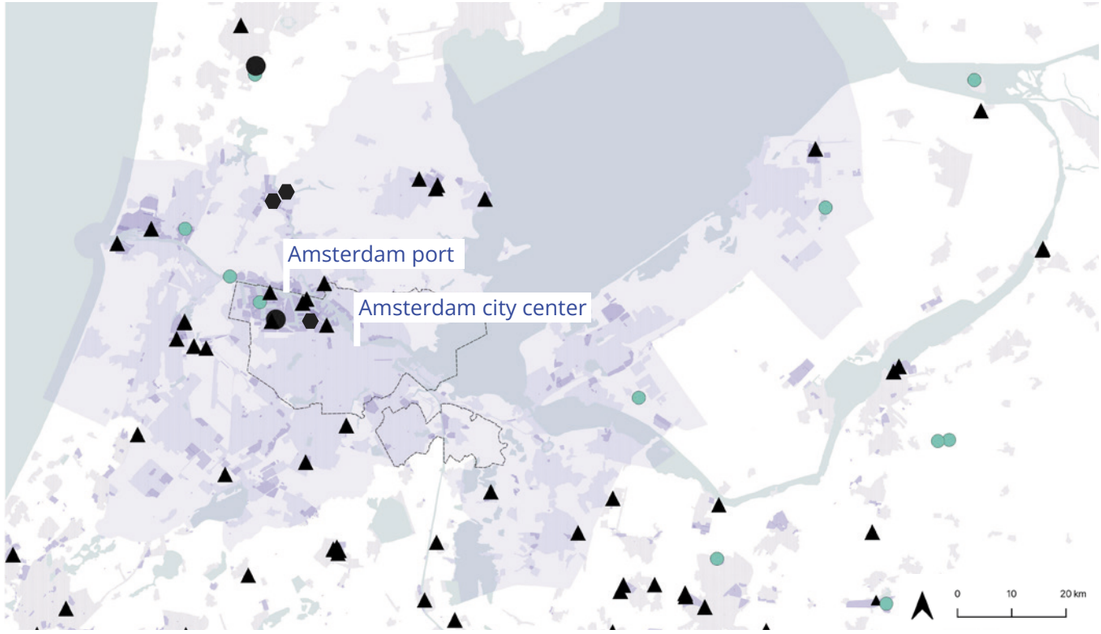
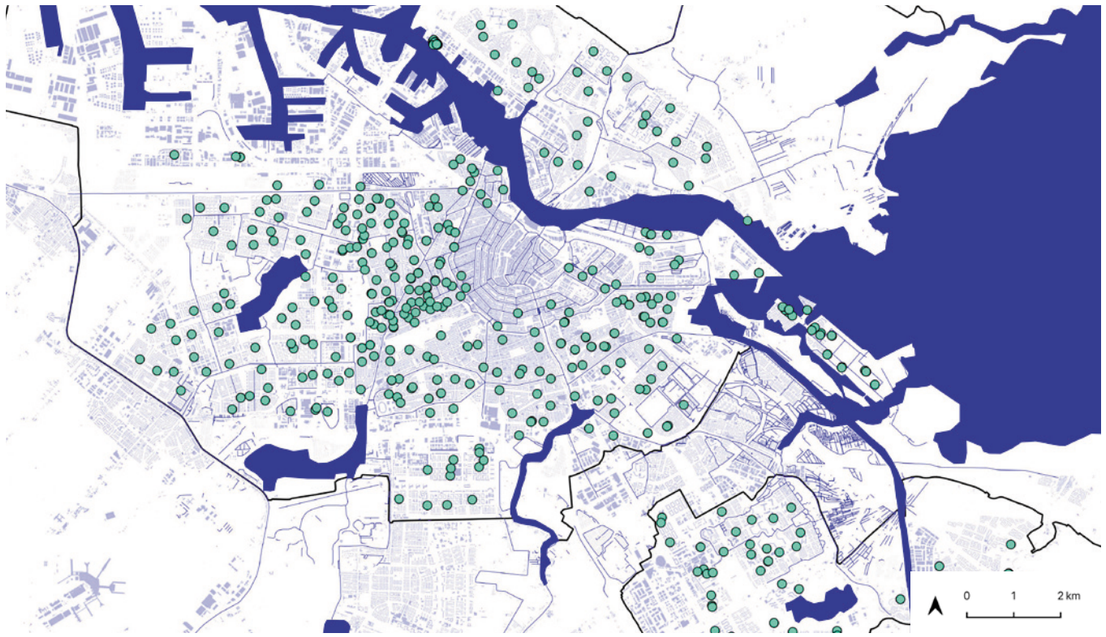


fig. 35 ***Regional end-of-life infrastructure***
source // author,
data based on OSM and EEA (2024)

municipal boundary
waste management centers
incineration plants
landfills
MRA

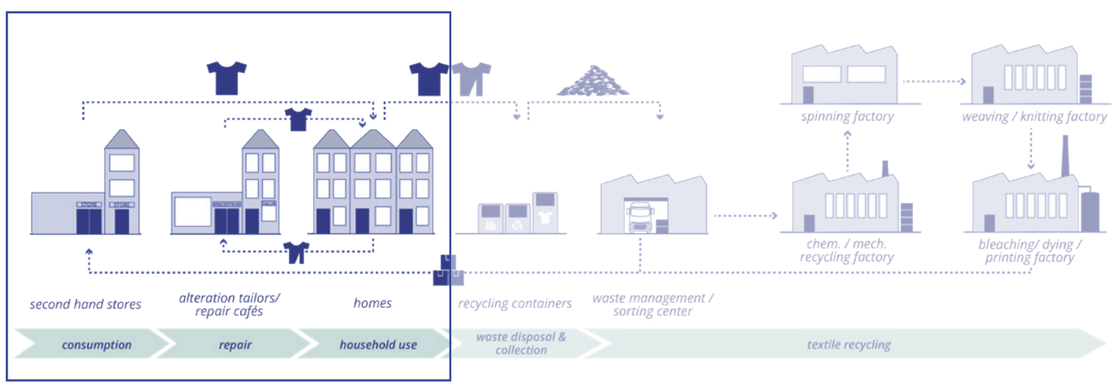
fig. 36 ***Local textile waste containers***
source // author,
data based on OSM and Municipality of Amsterdam (n.d.)

municipal boundary
textile containers



resale & repair places

In contrast to the vast and dense retail infrastructure shown on page 61, locations for circular clothing options such as repair and resale are relatively thinly spread across the city.
The second-hand-stores mapped in Figure 38 are mostly profit-oriented clothing resale stores that can afford to occupy central locations, while most of the repair cafés (see fig. 39) currently do not have permanent spaces. They are 'events' that are temporarily lead by volunteers in free spaces of neighbourhood centers. On average they happen once a month for two hours (Repair Cafes in Amsterdam, n.d.).



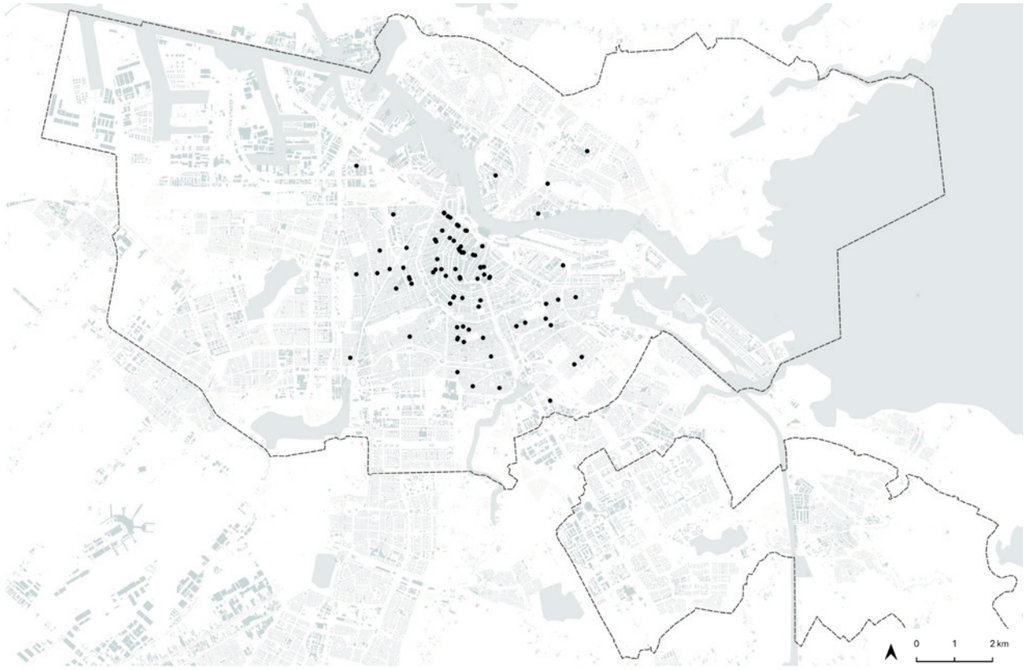


fig. 37 ***Locations for resale***
source // author,
data based on OSM and Repair cafes in Amsterdam (n.d.)

municipal boundary
second hand stores

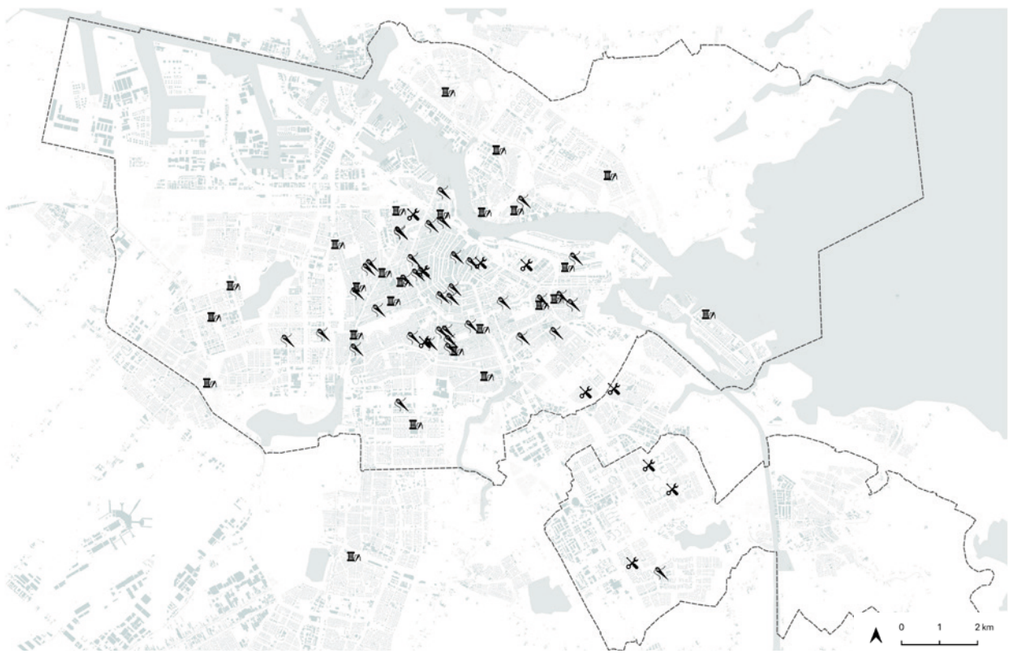


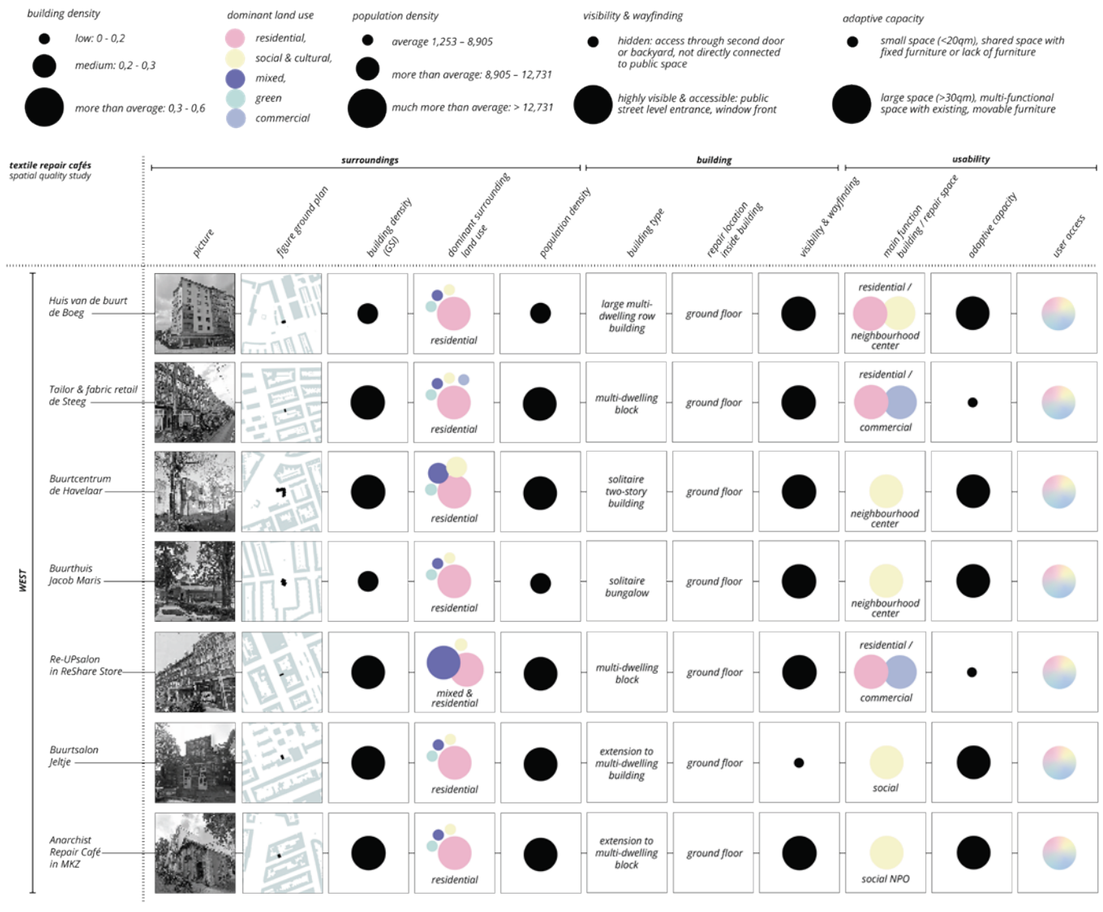
fig. 38 ***Locations for repair***
source // author,
data based on OSM and RepairCafes in Amsterdam

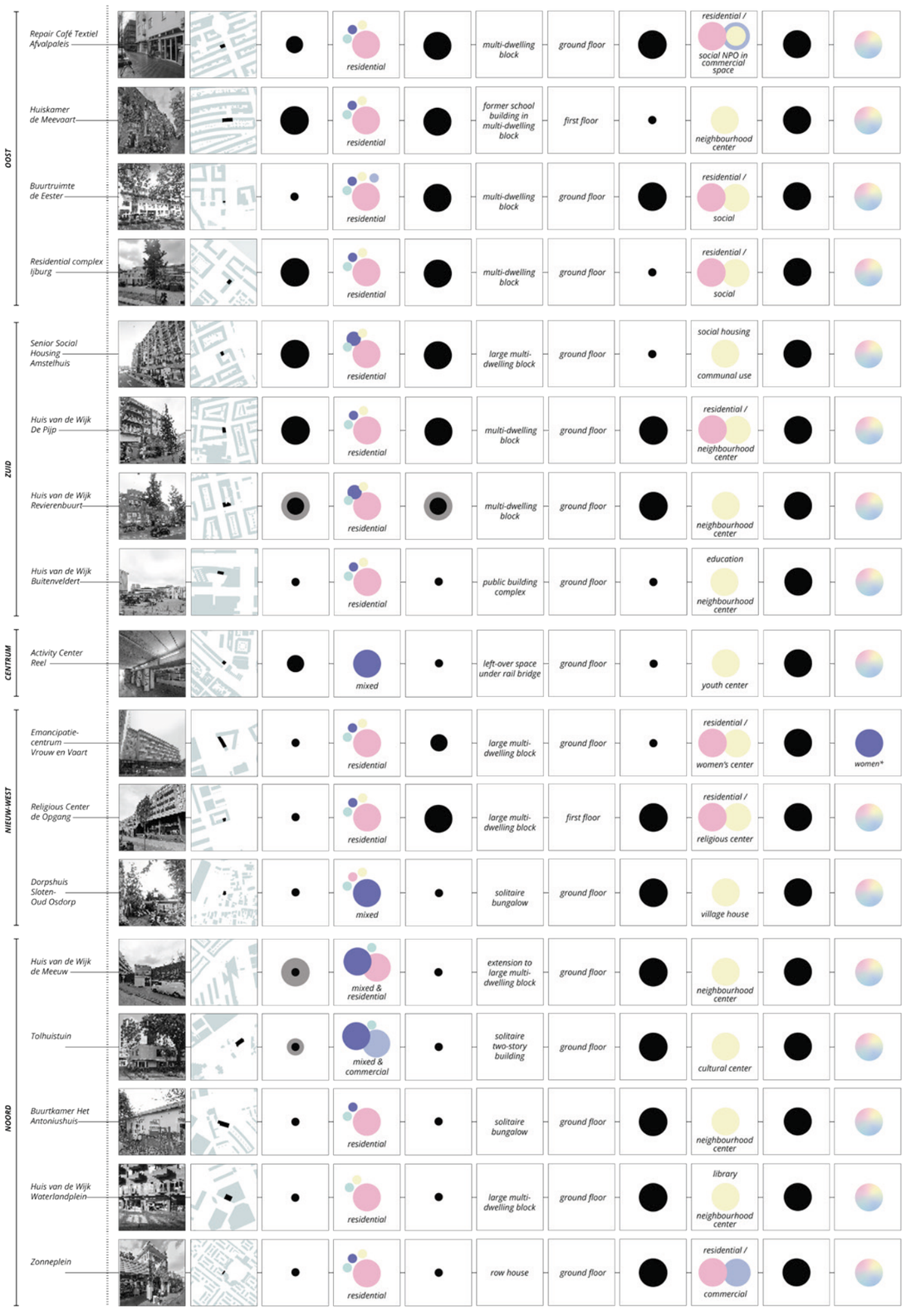
municipal boundary
repair cafés
alteration tailors

Amsterdam's repair café events

In order to define spatial patterns that currently enable collective clothing repair in Amsterdam, all repair café events in Amsterdam were systematically analysed based on the following criteria: ground plan, surrounding building density, dominant surrounding land use, population density, building type, repair location within the building, visibility and wayfinding, main function of the building, adaptive capacity, and user access (fig. 39). The following page summarises the findings that will inform the design based on current local ‚care-full' repair practices strengthening community cohesion.

fig. 39 ***Spatial analysis of repair café events in Amsterdam***
source // author





Amsterdam's repair café events

This comprehensive analysis reveals that spatial typologies for collective repair are highly diverse, shaped by their urban context and surrounding conditions.
Key findings include:

- Co-location: repair cafés can be integrated with social, residential, or commercial functions.
- Dominant hosting patterns: most repair cafés are hosted in social facilities, which primarily attract specific user groups; expanding into commercial spaces could broaden their inclusivity and accessibility.
- Proximity to residents: these initiatives are predominantly located in residential areas, ensuring convenient access for people who live and use textiles nearby and are likely to need repair services.
- Adaptive spaces: Repair cafés typically occupy spaces with high adaptive capacity, allowing for flexible use and easy transformation to accommodate repair activities and other functions.

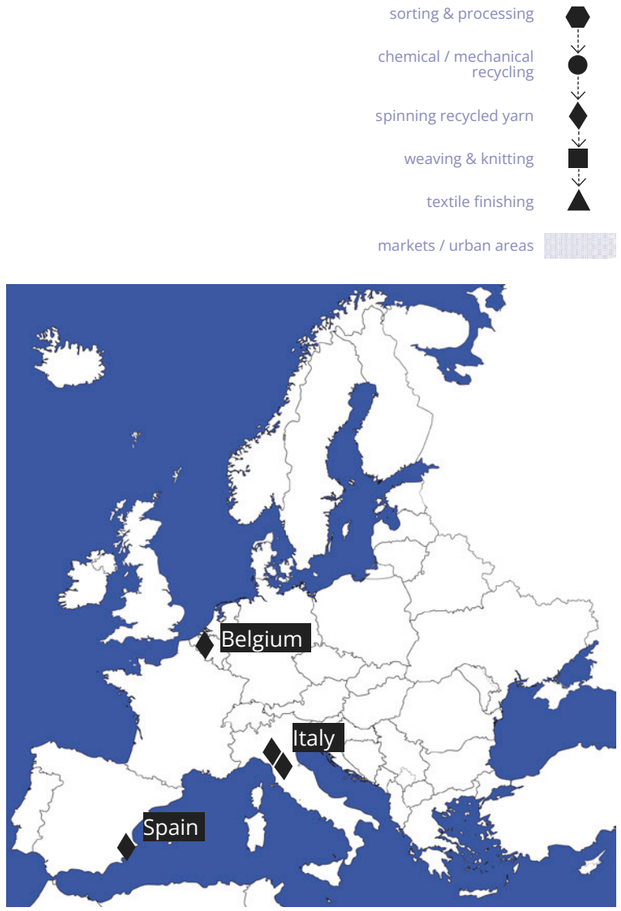
In conclusion, collective repair initiatives can be effectively integrated into a wide range of settings - from dense urban centers to mixed-use neighborhoods - by tailoring spatial configurations to local needs and opportunities.

fig. 40 ***Spatial typologies for repair café events***
source // author

care for space?
in textile recycling

Examining the spatial distributing of circular textile plants it becomes clear that there is an existing network of facilities from post-consumer sorting to recycled textile finishing in the Netherlands (fig. 41 & 42). The majority of businesses in the Netherlands sort and recycle textiles. Additionally, there are some locations for recycling, spinning, weaving & kniting and finishing. However, the capacity of those businesses to handle all used textiles discarded in the Netherlands is unknown. Factories in Belgium, Italy Spain are highly specialised in spinning recycled yarns (Luiken & Brinks, 2020).

fig. 41 ***Post-consumer circular textile processing locations (European & Netherlands scale)***
source // author



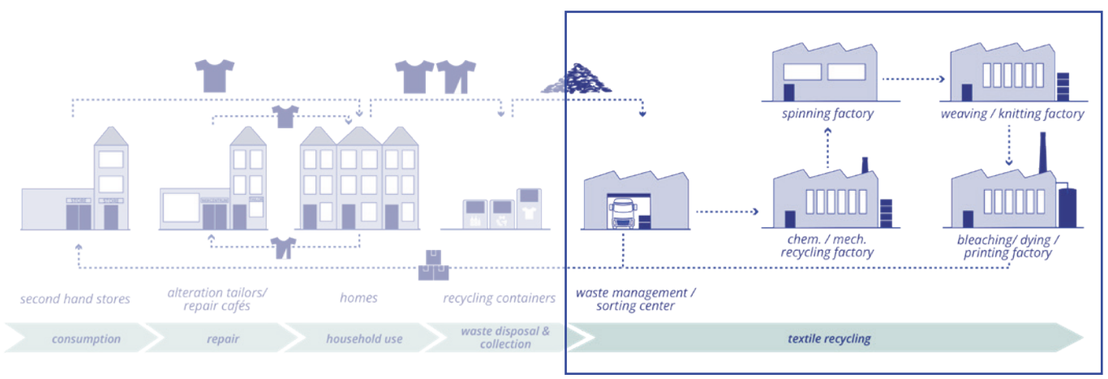
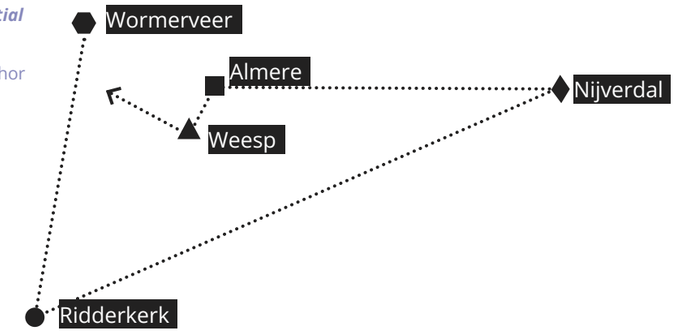


fig. 42 ***Potential circular value chain***
source // author



care for time?

This section analyses how ‚care-full' time-space relations of circular opportunities are planned out, in order to understand how conveniently accessible the repair and resale of clothing is for residents everywhere in Amsterdam.

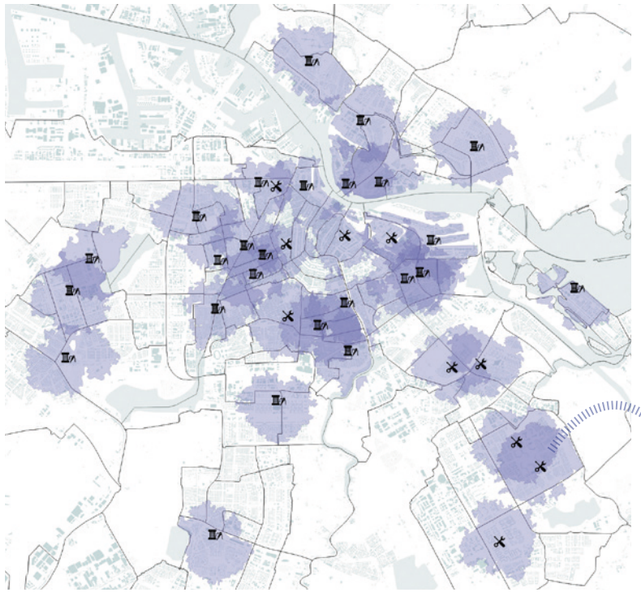
time-space relations
convenient access to repair café events

The premise of this time-space study is that Amsterdammers are less likely to repair their clothing items, when the location and timing of repair events are inconvenient to reach.

Therefore, the accessibility of repair events was measured in cycling minutes from a random residential address in every district of Amsterdam. The results are the following:
In Centrum, events only take place in the early afternoon 3 times per month, but are conveniently accessible within 3-9 minutes of biking.
In Oost, thanks to an active volunteering community events happen weekly, and are conveniently accessible within 6-10 minutes of biking.
In West, thanks to a very active volunteering group there is an events on every work day of the week, but moderately accessible within 7-10 minutes of biking.
In Nieuw-West a volunteering community organises weekly events,
which are conveniently accessible within 6-10 minutes of biking. However, events occur mostly in the morning, which is inconvenient for workers.
In Zuid volunteers organise weekly events, but mostly during working hours. These repair places have the most inconvenient time-space relations (12-16 min).
In Zuid-Oost a volunteering community hosts weekly events, but not for clothing repair.
In Noord an volunteers also organise weekly events, which are moderately accessible within 6-13 minutes of biking.

Overall, repair events are moderately convenient for residents who can and want to bike. However, this depends on their specific daily routes. Furthermore, for citizens who cannot bike, the walking time would be more than double, which cannot be considered convenient.

fig. 43 ***repair café events with 5-min bike radius***
source // author with TravelTime plug-in in QGIS



lesson learned // *there is a lack of conveniently accessible repair events in most districts*
principles // *providing spaces throughout the city with time sensibility for different schadules*

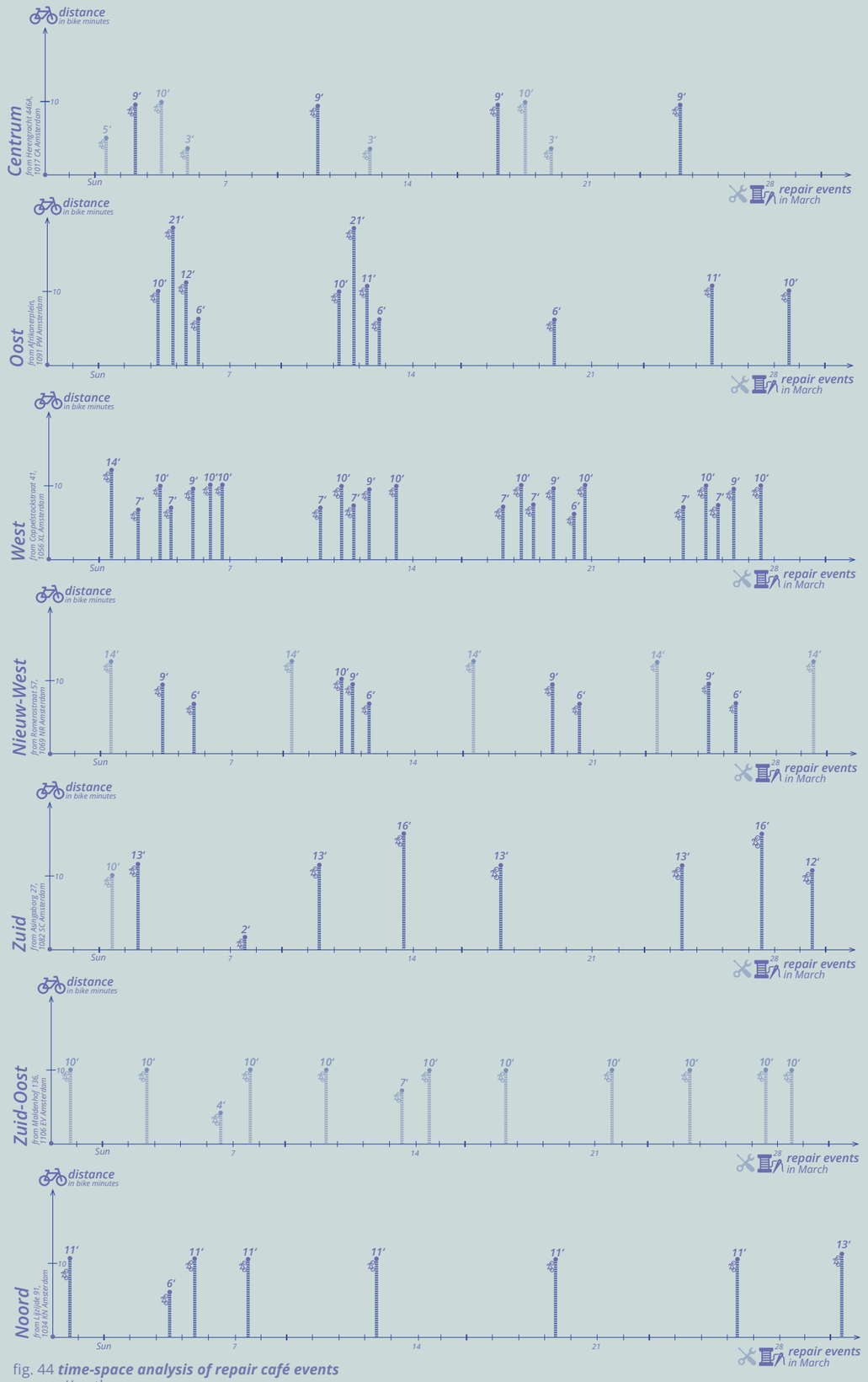


fig. 44 ***time-space analysis of repair café events***
source // author

Care for time?
access to circular options

Convenient accessibility was determined by mapping a 5-minute cycling radius around each resale (fig. 45) and repair location (fig. 46). The results show that resale stores are mainly conveniently accessible for Amsterdammers living near the city center, including the districts West and Oost and the norther part of Zuid and the southern area of Noord. Repair options provided by alteration tailors and repair cafés are more spread across districts, but there are some gaps in Nieuw-West, Zuid, Oost and Zuid-Oost. Additionally, it is important to note that most of the repair cafés are rarely accessible, as they are just lead by volunteers in neighbourhood centers.

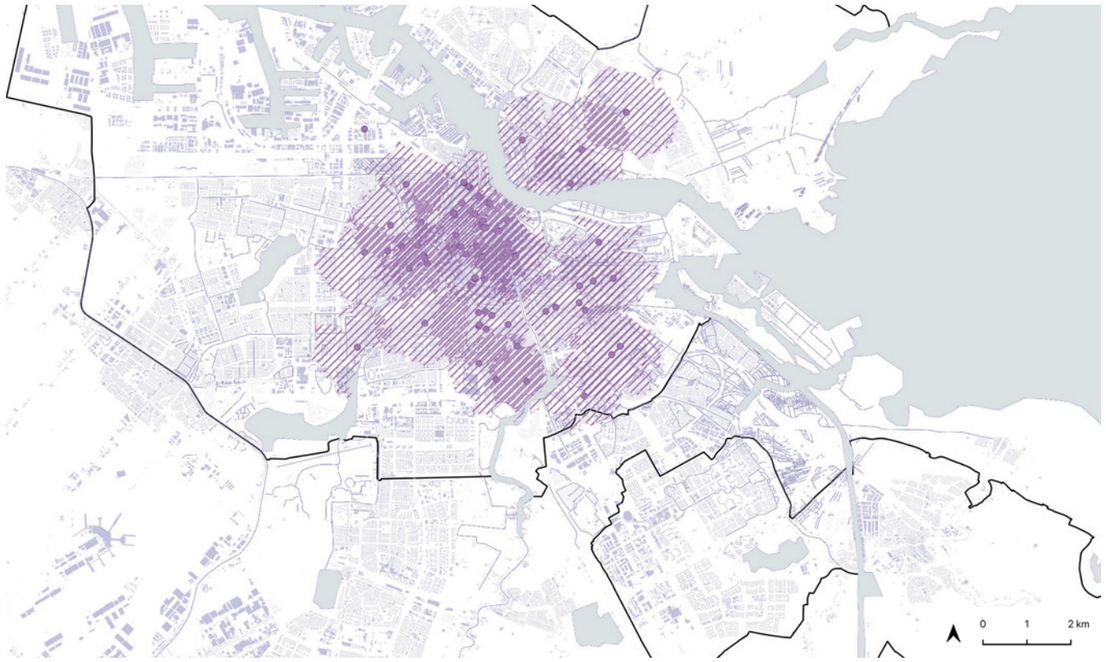


fig. 45 ***Convenient access to resale stores***
source // author,
data based on OSM created with TravelTime plug-in in QGIS

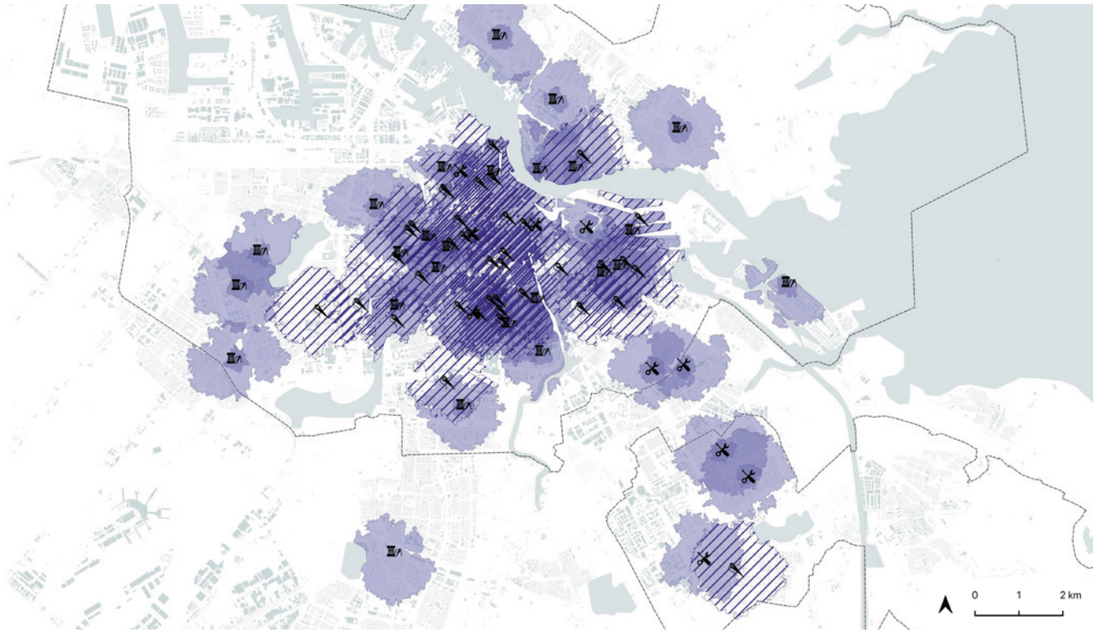


fig. 46 ***Convenient access to repair options***
source // author, data based on OSM and RepairCafes in Amsterdam created with TravelTime plug-in in QGIS

care for difference?

This section analyses if circular textile options cater to diverse community needs and conditions in order to understand how inclusive the repair and resale of clothing is for residents in Amsterdam.

accessibility for low-income households

This section is dedicated to analysing how ‚care-full' circular options of repair are distributed across the city considering different social factors in communities.

In Amsterdam there is many households (25-65%) that struggle to make ends meet financially (Rijksinstituut voor Volksgezondheid & en Milieu, n.d.). It is one of the municipalities in the Netherlands with the highest number (see fig. 48). The convenient coverage of repair options such as tailors and repair cafés is lacking in some areas with especially high amounts of households having financial trouble to afford a decent living standard (fig. 47).

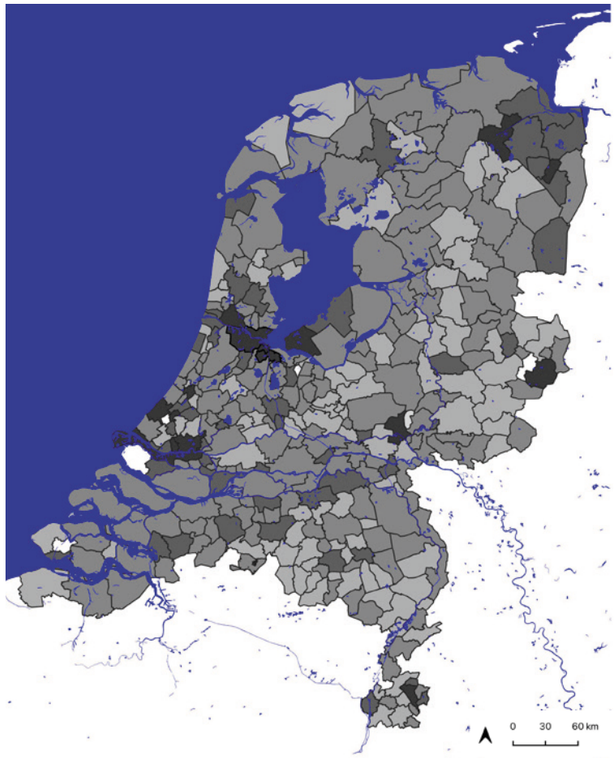


fig. 48 ***Percentage of residents in Dutch municipalities having trouble making ends meet*** source // author, data based on Rijksinstituut voor Volksgezondheid & en Milieu (n.d.)

1-5%
5-10%
10-15%
15-20%
20-25%
25-65%

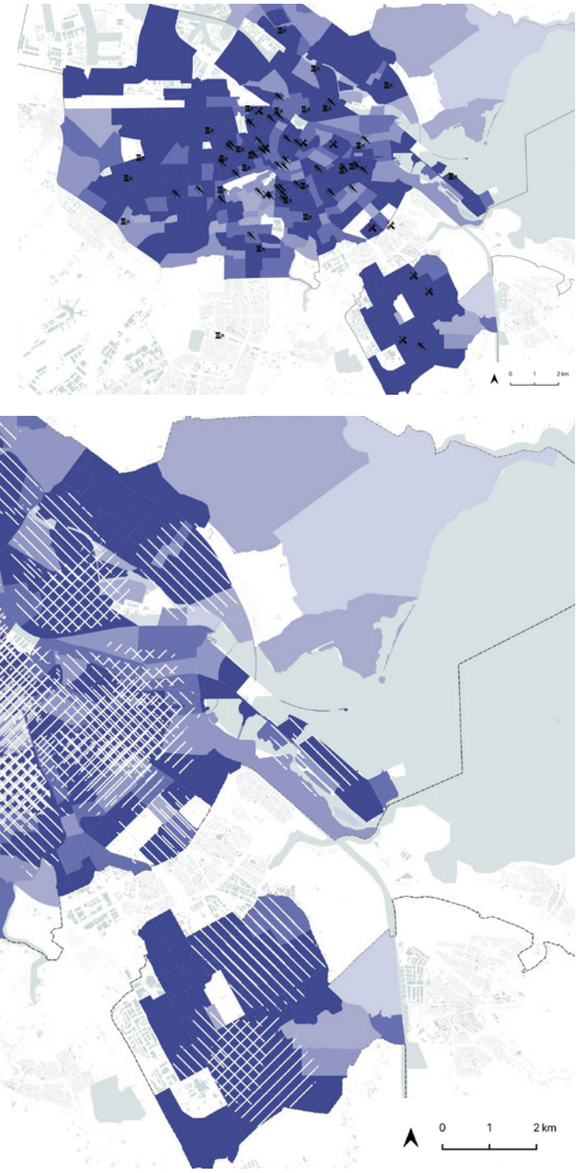


fig. 47 ***Percentage of Amsterdammers per neighbourhood having trouble making ends meet (right) with access to clothing repair options (below)*** source // author, data based on Rijksinstituut voor Volksgezondheid & en Milieu (n.d.)

accessibility for lonely Amsterdammers

A majority of residents in Amsterdam, like in many other municipalities of the Netherlands (see fig. 50), feel socially lonely.
In the majority of districts at least 39% up to 68% of Amsterdammers feel lonely. Repair cafés can be a source of social contact by building a community around repairing clothing and other household items. Nevertheless, not everybody in the city has convenient access to join this type of community. Figure 49 shows gaps in coverage in Nieuw-West, Zuid, Noord, Oost and Zuidoost.

fig. 49 ***Percentage of Amsterdammers per neighbourhood, who feel socially lonely (right) with access to repair cafés (below)***
source // author,
data based on Rijksinstituut voor Volksgezondheid & en Milieu (n.d.)

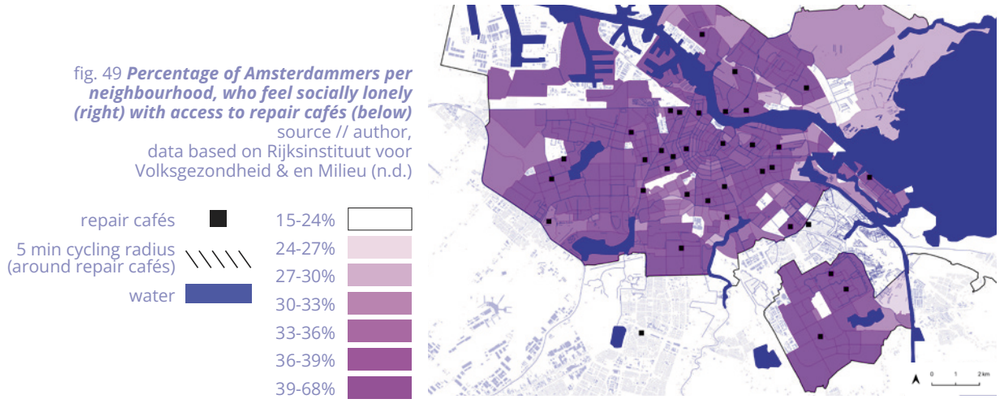
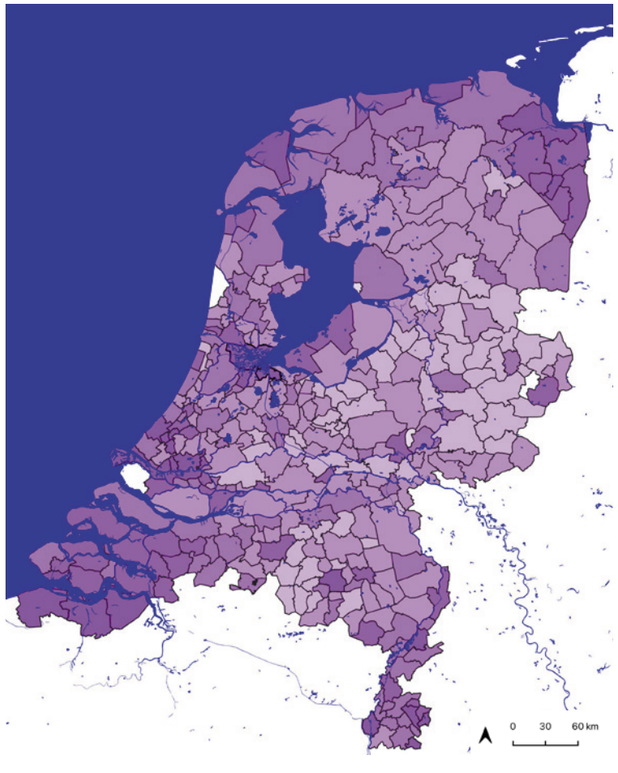
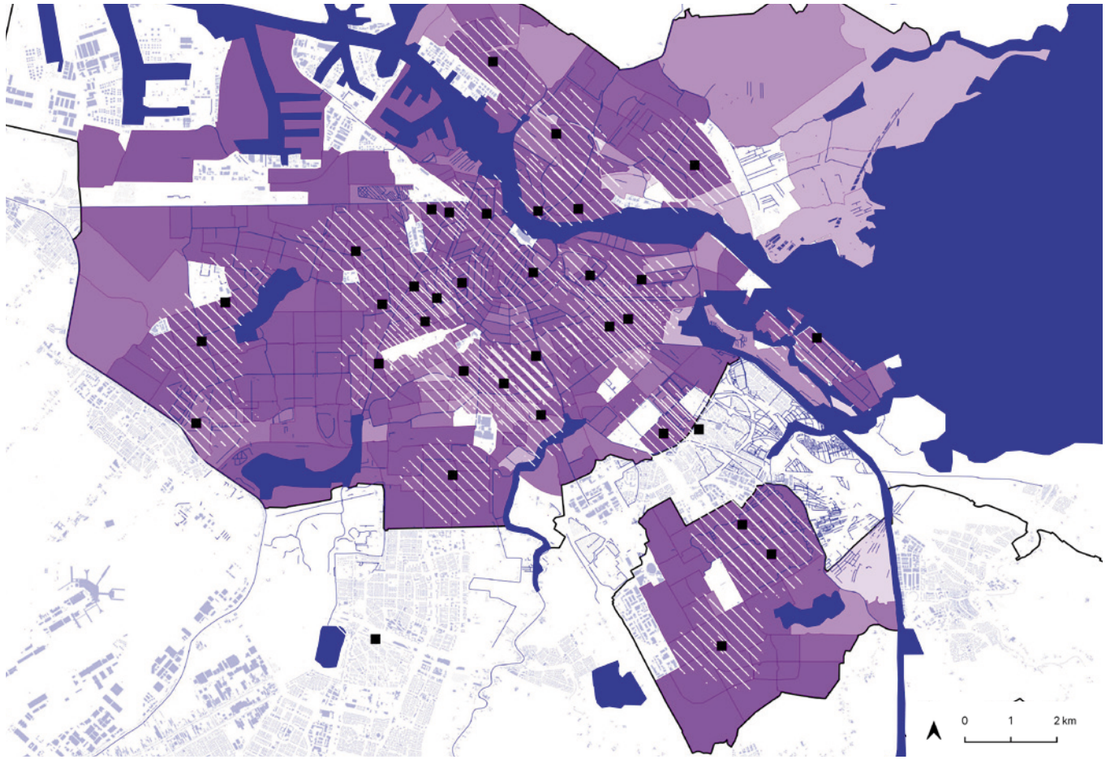


fig. 50 ***Percentage of residents in Dutch municipalities feeling socially lonely***
source // author,
data based on Rijksinstituut voor Volksgezondheid & en Milieu (n.d.)





‚care-full‘ policies?

Where are gaps in the policy system from the lens of a ‚care-full‘ circular transition?

This chapter aims to analyse and identify the gaps in current policies that shape the circular textile transition to finally make policy recommendations (p. 282) and propose a stakeholder strategy that enables a ‚care-full‘ circular textile transition (p. 186).

policy analysis
in the Metropolitan Region of Amsterdam

The goal of the policy analysis was to find gaps in relation to the five aspects of care (defined in fig. 52, based on Bono at al. (2024)). Analysed were the five key policies that influence spatial planning, circular economic development, circularity in the textile sector, as well as retail (fig. 51). Overall the policies address the aspects of care in the following ways (fig. 53):

carers
- All neglect to define actions for ensuring job quality, diversity of jobs and equal access to circular jobs.
- (4) addresses overall well-being of workers with specific actions.

materials
- (3) focuses on lower r-strategy of recycling.
- (1) aims for higher r-strategies (reduce, reuse, repair) and defines actions.
- (1) acknowledges potential social benefits of circular spaces but lacks in defining characteristics and actions to encourage that.

space
- (1,2,3,4) lack in defining specific spatial qualities and typologies for circular activities.
- (4) defines broad locations for circular practices (port, neighbourhoods, urban centres).

time
- (1,3) acknowledge the need for accessibility, but lack in defining it and specific actions to achieve it.
- (3) sets the goal of providing 50% more repair places for clothing before 2030.
- (5) allows repair-coupled retail in residential areas.

difference
- (1) recognises the opportunity to cater to different social needs but lacks in specific actions.
- (1) lack of actions for affordable services.
- (2) neglects including civil actors and stakeholders into networks.
- (3) support for existing local business initiatives.

reference number	*policy*	*goal*	*scale*	*type*
1	*Amsterdam Circular Strategy 2020–2025*	*strategising the circular transition of five city-wide value chains, one of which is consumer goods including textiles*	city	circular economy
2	*Implementation Agenda for a Circular Amsterdam 2023-2026*	*defining actions towards implementing the goals of the Circular Strategy 2020-2025*	city	circular economy
3	*MRA Circular Textile Roadmap*	*setting the stage for the transition of the textile economy in the region towards circularity*	region	circular textile industry
4	*Environmental vision Amsterdam 2050*	*setting guidelines for the design and development of the physical living environment of the city*	city	spatial development
5	*Retail Policy 2018-2022*	*ensuring attractive and strong shopping areas spread across the city*	city	economy

fig. 51 ***Table of analysed policies***
source // author

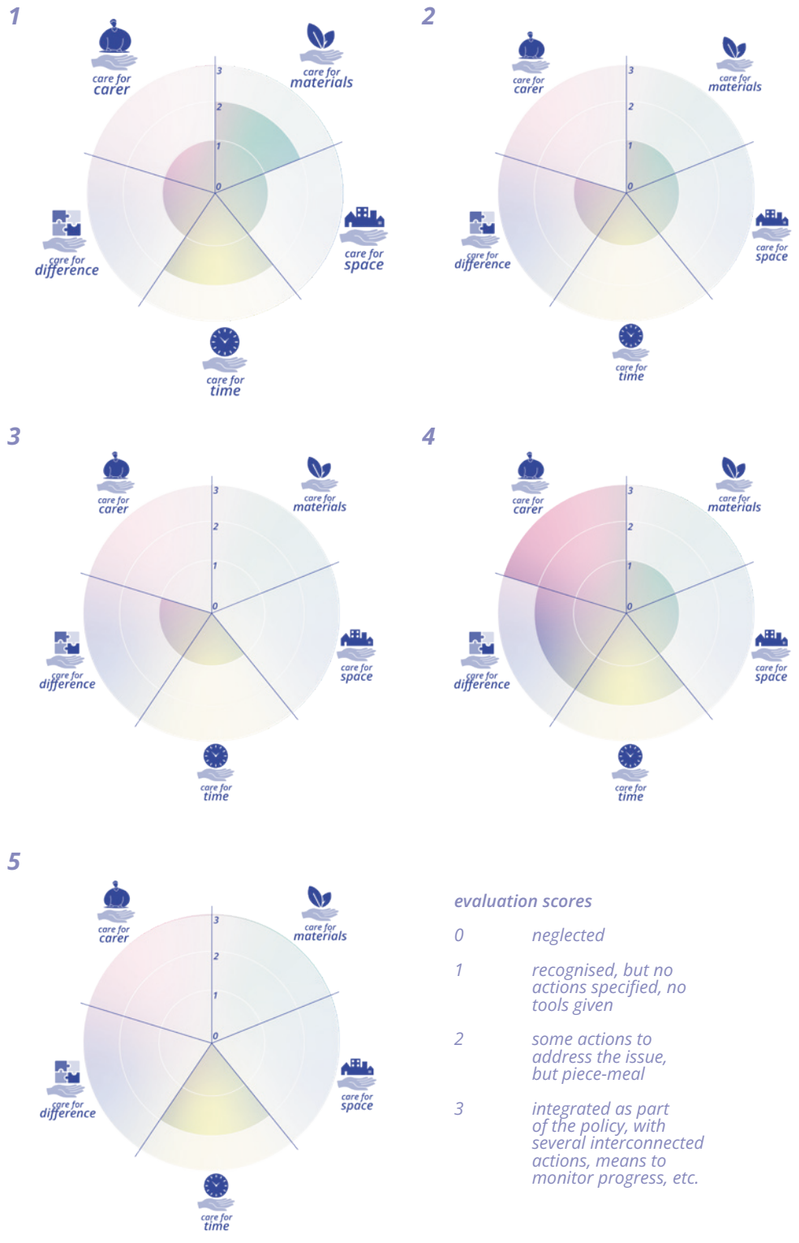


fig. 53 ***circle diagrams showing the scores for 'care-full' aspects***
source // author

type of care	*care for* ***carers***	care for **materials**	*care for* ***space***	*care for* ***time***	*care for* ***difference***
definition of 'care-full' aspect analysed	recognising & valuing CE workers through ethical & monetary revaluation of circular jobs in society by ensuring • fair job quality & conditions (salary, benefits etc.) • equal access (across class, gender, ethnicity, etc.) • quality of domestic well-being • shifting consumers to carers by raising awareness	• valuing the non-human by aiming at higher circular strategies • valuing it's connection to human (learning from indigenous, informal, improvised or everyday practices based on solidarity & social justice)	• communal access to non-market spaces (through leveraging underused or empty spaces) - for social-circular innovation, creativity, experimentation • defining spatial qualities, typologies and locations for circular practices	• convenient time-space relations (good accessibility) • long-term policy instruments • slowing down material cycles	• catering to diverse human & non-human actors: affordability, age-friendliness, etc. • valuing local collective vision, wisdom & initiatives

fig. 52 ***Table of analysed aspects***
source // author
note // the whole analysis tables can be found in the appendices

‚care-full' circular initiatives

What are existing ‚care-full' circular practices in the MRA?

This chapter seeks to identify and understand existing practices of individuals, communities or organisations that follow ‚care-full' principles in regard to carers, materials, space, time and difference to inspire the proposal of ‚care-full' interventions that can be upscaled in the region to drive a textile transition with positive effect on community well-being.

‚care-full' circular textile initiatives
in the Metropolitan Region of Amsterdam

There is a few private and civil initiatives in the region (fig. 54) actively involved in changing current values in local textile-related practices by caring for one or more of the following aspects important for ‚care-full' circularity: carers, materials, space, time and difference.

fig. 54 ***Locations of ‚care-full' innovators in the MRA***
source // author, data based on OSM

afvalpaleis - waste palace
social organisation in Amsterdam Oost

What is cared for?
The afval paleis is a social organisation dedicated to raise awareness about the amounts of waste that our society produces every day and aims to engage citizens to change little habits in daily life to avoid waste production by providing a space for repairing, exchanging, discussion and learning. Aside from being a hub for caring for materials it is a social contact point for a lot of vulnerable groups in the neighbourhood that find social interaction, purpose, fun, ears to listen, or else (care for difference in communities).

Who cares?
a diverse community of one paid full-time manager and many volunteers

How is care distributed?
builds a local social network

care for space & time
The initiative is housed in a 200 square metre ground floor retail space and includes a room with furniture for hosting workshops with adjacent kitchen, a huge open space devided into living room and play area with interactive information on sustainable living habits outfitted with furniture to stay, linger and chat, a hand-in counter with a ‚free give-away shop' as well as an access-restricted area with a professional repair work station. The Afvalpaleis is located in the heart of a neighbourhood in Oost under an anti-craken contract, which means that the organisation occupies the space to protect it from squatters until a suitable full-paying business wants to rent it. As a result, the afvalpaleis pay a small proportion of the market rent, but have no heating, hot water or long-term tenancy rights. They can be evicted at two weeks' notice. Despite this, they have been able to build up the palace over a number of years and have seen a gradual impact on people's attitudes and interest.

„we can only make an impact when we are here long-term, it can't just be a pop-up"
- social circular worker

This example underscores the critical importance of supporting bottom-up initiatives by ensuring they have access to financial resources and secure, appropriately sized spaces. For such initiatives to thrive, it is essential that these spaces are not only large enough to accommodate community activities but are also strategically located in the heart of a neighborhood, ideally near a point of interest - such as a weekly market - to maximise visibility and engagement.

Moreover, this case highlights the significant socio-ecological value that well-designed community spaces can generate. By offering an inviting atmosphere and being easily accessible to all residents, these initiatives foster social interaction, inclusivity, and a sense of belonging. At the same time, they promote sustainable practices and strengthen the local circular economy. Ultimately, providing the right support and infrastructure for grassroots projects can transform them into vibrant community assets that benefit both people and the environment.

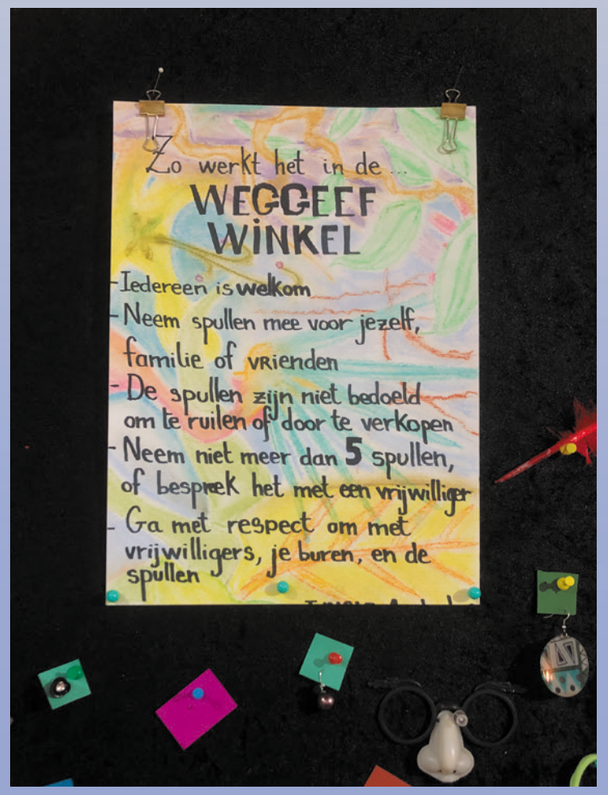


fig. 55 ***Impressions from the waste palace***
source // author, March 2025

United repair centre
social enterprice for ‚care-full' repair

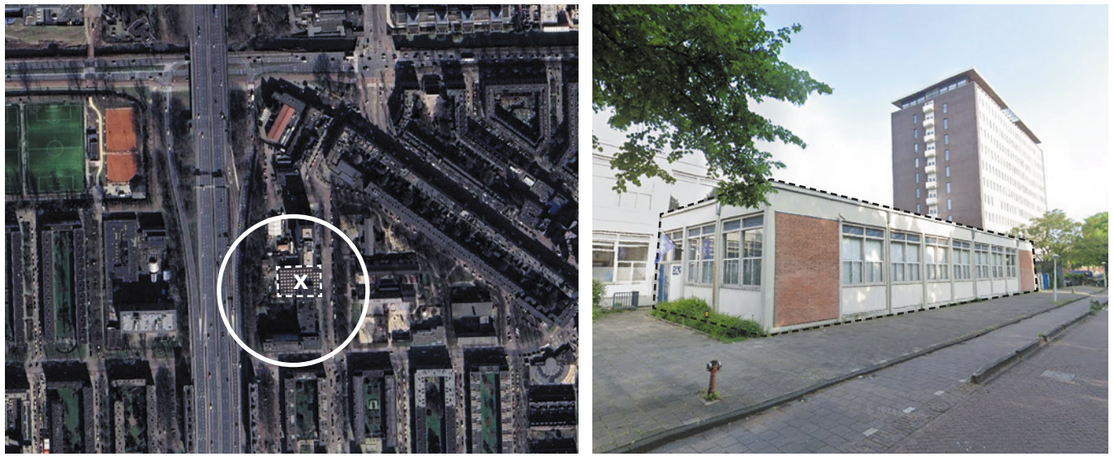
The United Repair Centre is a social enterprise, based in Amsterdam and London, that cares for carers & materials by actively promoting change within the traditional apparel value chain with offering repair services to retail businesses (B2B) and therefore, extending the lifecycle of clothes through to reduce textile waste in the fashion industry.
For repair newcomers or individuals distanced from the labor market, they offer training in their academy program for becoming skilled tailors at their repair centre.
Furthermore, they try to spread the repair fun by holding workshops for companies and consumers.

The United Repair Centre exemplifies a ‚care-full' approach to providing up-scaled repair services within the textile value chain. Unlike popular repair café initiatives that depend on unpaid volunteers, the United Repair Centre employs a diverse team of workers under fair and secure working conditions. This commitment to job quality ensures that employees receive proper wages, stable contracts, and opportunities for professional development, setting a benchmark for inclusivity and social responsibility in the sector.

Strategically located near a public transport station, the Centre is easily accessible for both employees and customers, promoting sustainable mobility and broadening access to its services. The Centre is also a notable example of urban light manufacturing integration, as it operates within a repurposed building structure.
By transforming an existing facility adjacent to a public school and residential buildings, the United Repair Centre revitalises underused urban space.

Overall, the United Repair Centre demonstrates how repair services can be embedded in the urban fabric in a way that prioritises social equity, accessibility, and textile circularity.
Its model highlights the potential for circular textile initiatives to create meaningful and inclusive local jobs.

fig. 57 ***United Repair Centre Amsterdam location***
source // google maps & streetview



The creative lab
hand-crafting community

The creative lab is a self-lead community of small-business owners who care for materials by embracing traditional techniques of hand-crafting fashion, art, ceramics and interiors. The community members working with textiles use techniques such as knitting, sewing or crocheting. Scientific research underlines that knitting in a community improves perceived happiness, and social contact and communication with others next to relaxation and creativity (Riley et al. 2013).
The community organises pop-up events to connect, sell their products and share skills in rented spaces such as the Studio Wieman, a former mechanic's garage, that was transformed into a venue location.

This initiative is a ‚care-full' example for demonstrating how caring for materials in traditional ways can build a community. It also underlines the importance of providing suitable spaces to those communities to thrive.

fig. 59 ***Temporary venue site***
source // google streetview

circulair ambachtscentra
Kringloopbedrijf De Lokatie

What is cared for?
As part of the National Programme for a Circular Economy (NPCE) circular craft centers are a typology of place that is either an independent location or a network that aims to care for materials, carers and difference in communities through combining the functions of recycling centre, second-hand shop, repair workshop and education.

Who cares?
It is a collaboration of the Rijkswaterstaat, the Dutch Association of Recycling Companies (BKN), the Association of Dutch Municipalities (VNG), the Dutch Association for Waste and Cleaning Management (NVRD) and the Repair Cafe Foundation on behalf of the Ministry of Infrastructure and Water Management.

How is care distributed?
Thrives through an active volunteering collective, promotes community building, (temporarily) subsidised by the Ministry of Infrastructure and Water Management.

care for space & time
One of three circular craft centers in Amsterdam is De Lokatie, which is located in an industrial area in Noord Overhoeks and since the formerly indusrtial plot was developed into a new residential quarter, it is adjoining.

This example demonstrates that a combination of diverse functions - recycling, resale, repair, and education - can successfully coexist within a hybrid space, creating vibrant hubs for circular activity. It also highlights the lifting of traditional spatial boundaries between industrial and residential uses, signaling a growing acceptance of living in proximity to 'waste' management and circular economy sites. However, it also reveals a challenge: as industrial areas are increasingly converted to address the housing crisis, the available space for circular economy activities is reduced, potentially limiting the growth and impact of such initiatives in the future.

fig. 60 ***Streetview of De Lokatie (on the left) across the street of new residential blocks***
source // google streetview

fig. 61 ***areal photo of De Lokatie***
source // google earth

analysis
conclusion

swot
key points

city
space
- vast land holdings owned by the municipality, offering significant potential for the development of circular infrastructure and community spaces.

carer
- an active grassroots volunteering community focused on repair, reuse, and resale activities, driving local engagement and fostering a culture of care.

materials
- an emerging resale market, indicating growing opportunities for extending the life of textiles and other goods through second-hand channels.

region
carer
- presence of active circular industrial initiatives, supporting large-scale material recovery, processing, and redistribution, and connecting local efforts to broader regional networks.

city
space/time
- high accessibility of linear market spaces.
- low accessibility of circular market and non-market spaces.

material
- high consumption of linear textiles.
- low reuse, repair & recycling rates: 70% of textiles end up in residual waste (incinerated in the port).

carer
- low-quality jobs: minimum wages, temporary contracts, part-time work models.
- dependence on unpaid volunteers (e.g., Dutch trademark resale and repair cafés).
- social pressures: citywide loneliness, low resilience, financial strain on households, and weak social cohesion.
- difference: gender gap and vulnerable groups in circular jobs, vulnerable residential groups have less access to non-market social repair cafés or circular-market spaces

region
material
- harbour-oriented material processing: high export rate of textile waste (externalizing social/environmental costs abroad).
- high incineration rate of textile waste.

space
- land artifitialisation: expansion of logistics networks in hinterlands, degrading natural landscapes.

policies
- lack of defined locations, typologies, or spatial qualities for textile circularity initiatives.

s *trengths*

w *weaknesses*

o *opportunities*

city
materials
- emerging resale market and growing public interest in second-hand textiles.
- Dutch repair trademark culture: strong tradition and reputation for repair, supporting circular practices.

space
- vast municipal land under ground lease: significant potential for developing dedicated circular infrastructure, such as repair hubs, or community workshops.

carer
- active volunteering community for repairing: a robust base of engaged citizens ready to support and scale circular initiatives.
- innovation hub with international relevance: concentrated knowledge and expertise, positioning the city as a leader in circular solutions.
- part of Circular Textile Valley: enhances the ability to secure funding, share knowledge, and participate in collaborative innovation at the regional and international level.

region
space
- wastelands and linear industrial infrastructure: underutilised areas that can be transformed into regional circular hubs, material recovery facilities, or bio-material processing sites.
- materials:
- agricultural industry for sourcing bio-materials: opportunity to develop local, regenerative textile supply chains using crops like hemp or flax.

policies
material
- ambition to loop textiles: clear policy direction towards closing material loops and reducing waste.

t *hreats*

city
carer
- intensified social pressures: declining social cohesion, rising loneliness, and poverty create barriers to community-led circular initiatives.

space
- high land competition: market-oriented spatial development (prioritising high land value) sidelines non-profit circular projects, hindering a just transition.

material
- recycling inefficiency: current recycling processes consume excessive energy, water, and chemicals, undermining their environmental benefits.

region
- material: increasing textile waste through ultra fast fashion trend, CO2 emissions through incineration of residual waste, incineration lock-in through privatisation of plant

policies
- techno-centric focus: focus on recycling (vs. higher R-strategies like repair) limits systemic change.

swot
spatial conclusion

This map shows conclusions of challenges and potentials on the regional scale.

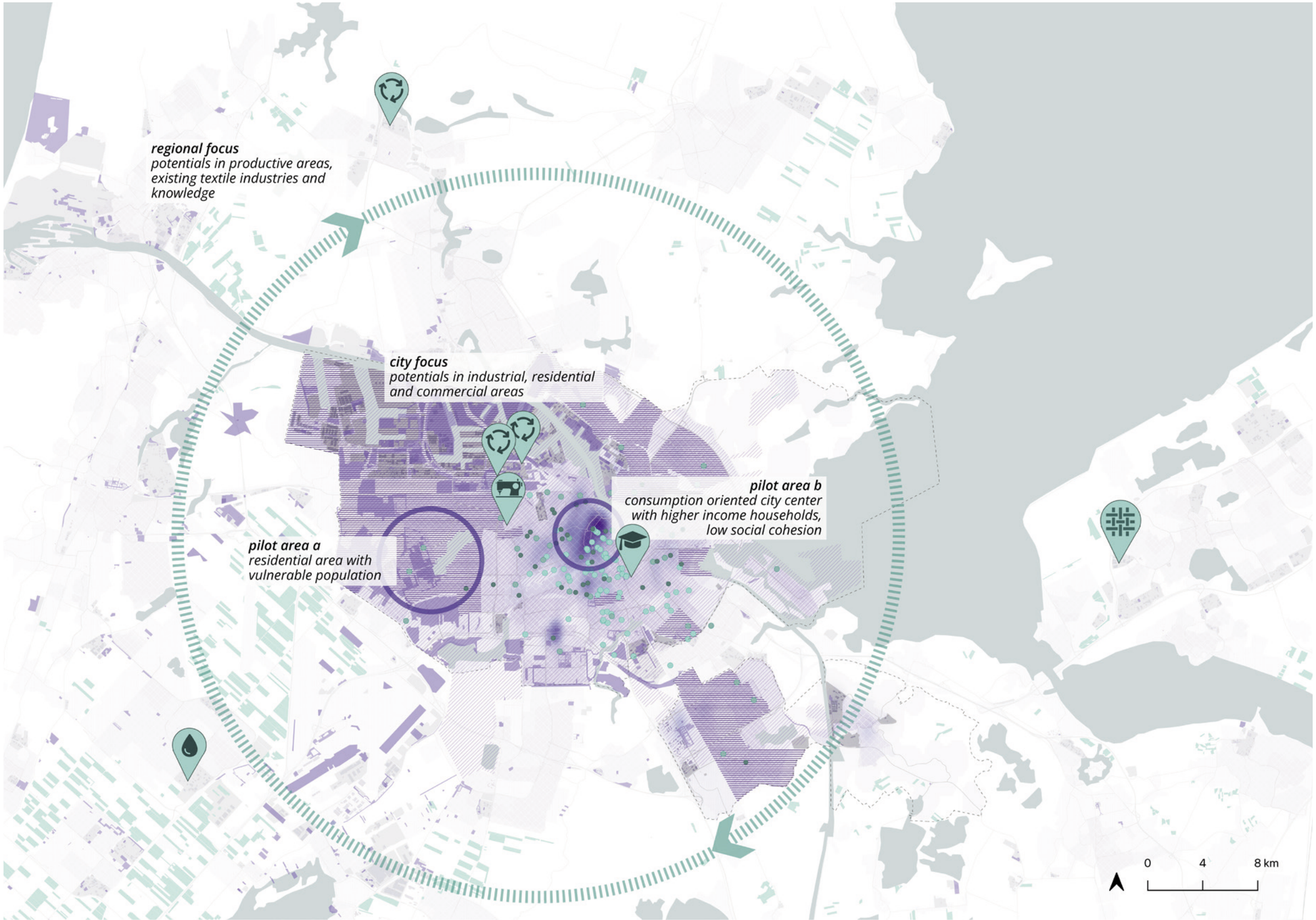


fig. 62 ***Conclusion map of challenges and potentials***
source // author

- *land owned by municipality*
- *polluted land*
- *agricultural residues for bio-materials*
- *active volunteering community*
- *emerging resale market*
- *repair market*
- *local & regional circulation*
- *innovative textiles actors*
- *logistics center for storage*
- *low social cohesion*
- *population with low socio-economic score*
- *heatmap of retail stores*

swot strategies
for ‚care-full' transformation

Combining identified strengths and opportunities to address weaknesses and threats defined in the swot analysis provides a first set of strategies for the ‚care-full' transition of the textile value chain in the MRA. These build the base for the pattern language.

Care for materials
in the MRA

- utilising agricultural residues from the region & vast existing logistical and industrial infrastructure to close textile loops locally and reducing textile incineration.
- textile materials should first be repaired, then reused, before they are recycled to reduce environmental footprint.
- pure material composition is best for circular processing.

Care for space & time
in the MRA

- local circulation of materials to control environmental and social impacts.
- repurposing industrial areas for local textile processing.
- communal access to circular communal and circular market spaces.
- activating underused wastelands such as drosscapes and polluted land.
- taking advantage of vast communal-owned land to put ccircular conditions for urban renewal projects.

Care for carer
in the MRA

- circular workers take active care of society's future - their social status and work conditions should reflect that.

Care for difference
in the MRA

- harness the potential of circular practices to build community cohesion and fight loneliness by strategically providing infrastructure and resources for collective looping.

care-full circular textile futures - a pattern language

V

What are spatial and socio-ecological strategies for a ‚care-full' circular textile value chain?

This chapter seeks to define strategic interventions including spatial and socio-ecological strategies informed by the analysis of current ‚care-full' and ‚care-less' structures to foster the implementation of a ‚care-full' circular textile value chain (p. XX).

introduction & development process

A pattern language is a design method that brings together knowledge from different fields and scales. This approach allows for flexible design while helping to understand the impact of design choices. First introduced by Christopher Alexander (1977), it consists of a network of design solutions, called a pattern field, organised according to their relations. This structure helps to break down complex problems into comprehensible units of knowledge and shows how changes at one level can lead to changes at another. Therefore, pattern language is a useful tool for designing systemic change in this context. In this thesis, it is used to explore how broader system transformation connects to changes in programs and land use.

The pattern set and network was started to be developed based on conclusions from the analysis of ‚care-full' aspects in the context of the MRA and informed by the three main theories introduced in the theoretical framework. Later the pattern set was expanded based on the conclusions and strategies of the site analysis of the pilot areas.

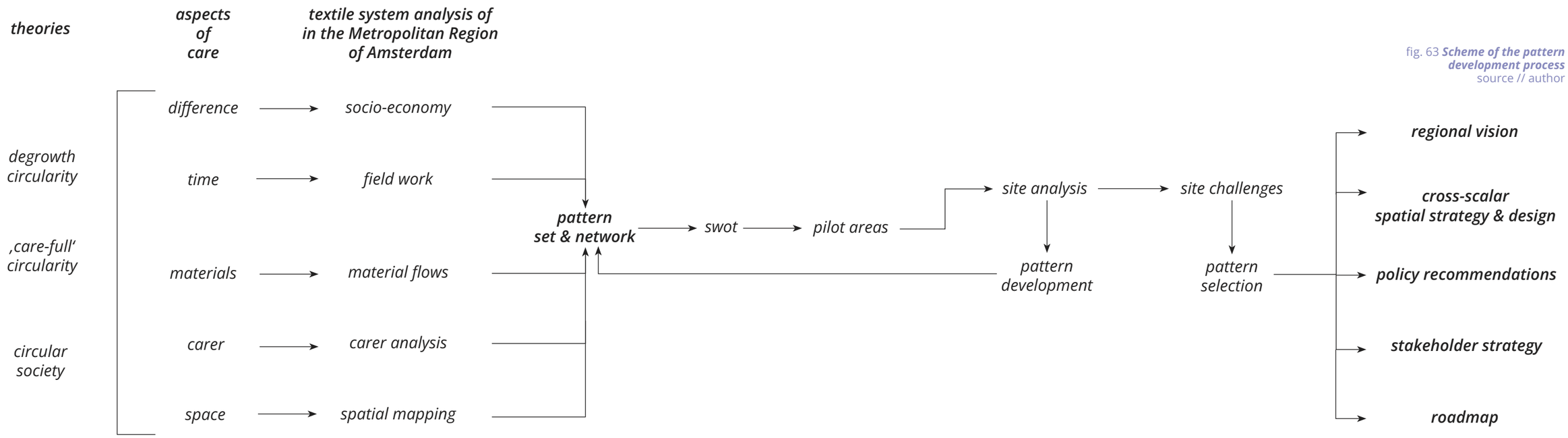


fig. 63 ***Scheme of the pattern development process***
source // author

key dimensions of action

This diagram (fig. 64) visually organises the main dimensions of action needed to be addressed for the transition towards a ‚care-full' circular textile system, using three key spatial planning tools: spatial design, governance, and policy. Each tool is represented as a distinct section, and within each, relevant spatial aspects and other strategies are mapped out to illustrate their interconnections and roles.

spatial design

This dimension focuses on the physical and functional aspects of space that support circular textile practices.

spatial qualities
- Visibility, accessibility, flexibility, short distances: These qualities ensure that textile circularity activities are easy to find, reach, and adapt to changing needs.

spatial context
- Bio-regional production: Aligns textile activities with local ecological and economic contexts.

spatial functions & infrastructure
- ecological regeneration, closing/ narrowing/slowing textile loops, zero-emission transport: These functions describe how spaces and infrastructure can support sustainable textile flows and reduce environmental impacts.

community elements
- Raising awareness, community building, commoning: Design can foster social engagement and collective stewardship.

governance

This dimension addresses how spaces and activities are managed and shared.

ownership & space use
- governance models encourage shared ownership and use of spaces, empowering communities to co-manage textile initiatives.

policy

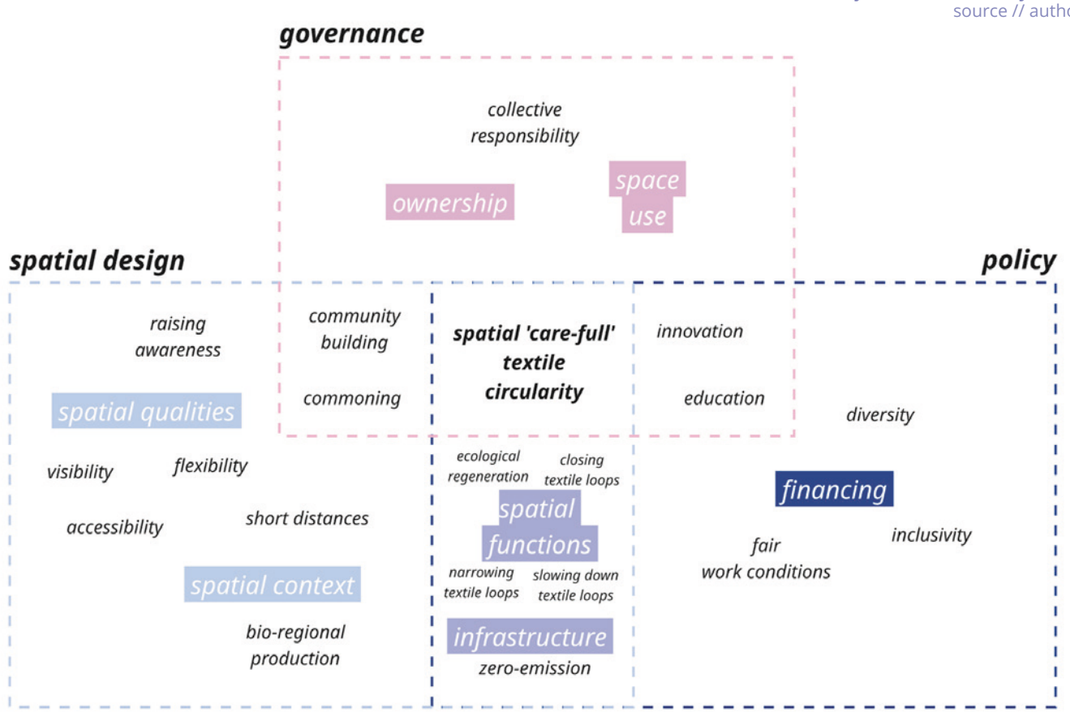
This dimension highlights regulatory and strategic support for circular textile systems.

financing
- equitable funding, fair work conditions, inclusivity: Policies should ensure fair and inclusive access to resources and opportunities, supporting social equity.

innovation & education
- policies can drive innovation and provide educational opportunities, both essential for systemic change.

diversity
- promoting diverse strategies ensures that different groups are included and benefit from circular textile systems.

fig. 64 ***Pattern field of main dimensions of action***
source // author



one pattern explained
content & graphic

main dimension of action *of the pattern*
- *G = governance*
- *P = policy*
- *S = spatial design*

scale *at which the pattern is most effective*
- *transscalar*
- *region*
- *city*
- *neighbourhood*
- *block/building*

colour *for main care aspect**

source *of the pattern*

■ *theory*
- *cities of making (c)*
- *Savini, 2023 (s)*
- *Bono et al., 2024 (b)*
- *Williams, 2021 (w)*
- *McGlynn et al., 2012 (m)*

scheme *demonstrating the practical implication of the pattern*

▲ *analysis*
- *interview (i)*
- *spatial analysis (s)*
- *material flow analysis (m)*
- *field work (f)*

title *of the pattern*

● *design*

main objective *of the pattern and what aspects of care it addresses (based on Bono et al., 2024)*

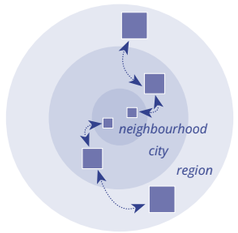
indicators *for impacts on aspects of the social foundation of the Doughnut based on Raworth (2020) and circularity category based on the r-ladder*

circularity	***social foundation***
regenerate	*healthy*
reduce	*empowering*
slow down	*enabling*
close	*connecting*

(if symbol is lighter, the respective aspect is impacted indirectly)

S02 ***scale*** *neighbourhood - city - region*

c s ○



multi-scalar textile looping infrastructure

A multi-scalar network of infrastructure for textile looping *enables textiles to be effectively looped within the region.*

circularity

social foundation

what is cared for?

space time materials

links
- P01, S08, P07, S05, S06, + S03, S04, P11, G05

relation *to other patterns*
- \+ *enabling or supporting*
- / *alternating*
- \- *conditioning*

who cares?
local and regional governments, citizens, circular businesses for textile repair, sorting, storage and recycling

carers *who are either actively involved or indirectly effected by the pattern (based on Bono et al., 2024)*

how is care distributed?
collaboration, (P11) commercial and (G05) collective looping

the type *of organisation and extent to which care is distributed (based on Bono et al., 2024)*

problem context
Regions typically lack in multi-scalar infrastructure that is coherently integrated at the regional, city and neighbourhood scales to manage the segregation, collection, and processing of textile flows. This fragmentation limits the potential to establish effective circular loops and keeping the value of used textiles within the region.

problem context *that the pattern addresses, drawn from theory, analysis or design*

practical implications

outline *of the solution the pattern offers with elaboration on relation to other patterns*

region: *(S03) repurpose existing structures in industrial areas, such as warehouses, linear factories for (P11) commercial looping such as sorting & storage, recycling, spinning, weaving & finishing*

city: *(S03) repurpose existing structures in industrial and commercial areas, such as retail stores for (G01) re-pair, and parking garages near (S08) public transport nodes (S05 drop & collect stations) for (P11) commercial looping such as repair, remaking, resale*

neighbourhood: *(S04) activate underused spaces for (G05) collective looping such as share, repair, re-make via (S19) block wardrobes and (S20) share & care cafés*

aspect of care *the pattern addresses* *(based on Bono et al., 2024)*
- *space*
- *materials*
- *time*
- *carers*
- *difference*

fig. 65 ***Pattern explanation***
source // author

the pattern field
five aspects of care across scales

The development of the pattern field was a gradual and iterative process, shaped by multiple research methods (as presented on pages 124-125) that contributed a range of principles towards ‚care-fullness' and revealed meaningful connections between these. What distinguishes a set of patterns to a fully functional pattern field is its internal structure - specifically, the relationships between patterns and the hierarchical organisation across scales. The true value of a pattern language lies not just in individual patterns, but in how they are interlinked to form a coherent system of design solutions (Salingaros, 2008).

One key challenge in developing a coherent pattern field is the lack of cross-scale connections, which weakens its effectiveness. Patterns should not stand alone, since their true strength lies in how they combine to form higher-order patterns, whose qualities are based on the interactions of lower-level ones. This relational structure is what enables the pattern language to support systemic understanding and design.

Figure 103 shows how the pattern field of the developed ‚care-full' patterns, which are distributed across different scales to ensure a systemic approach. The interrelations between the patterns will be introduced in the next chapter to support the design decisions.

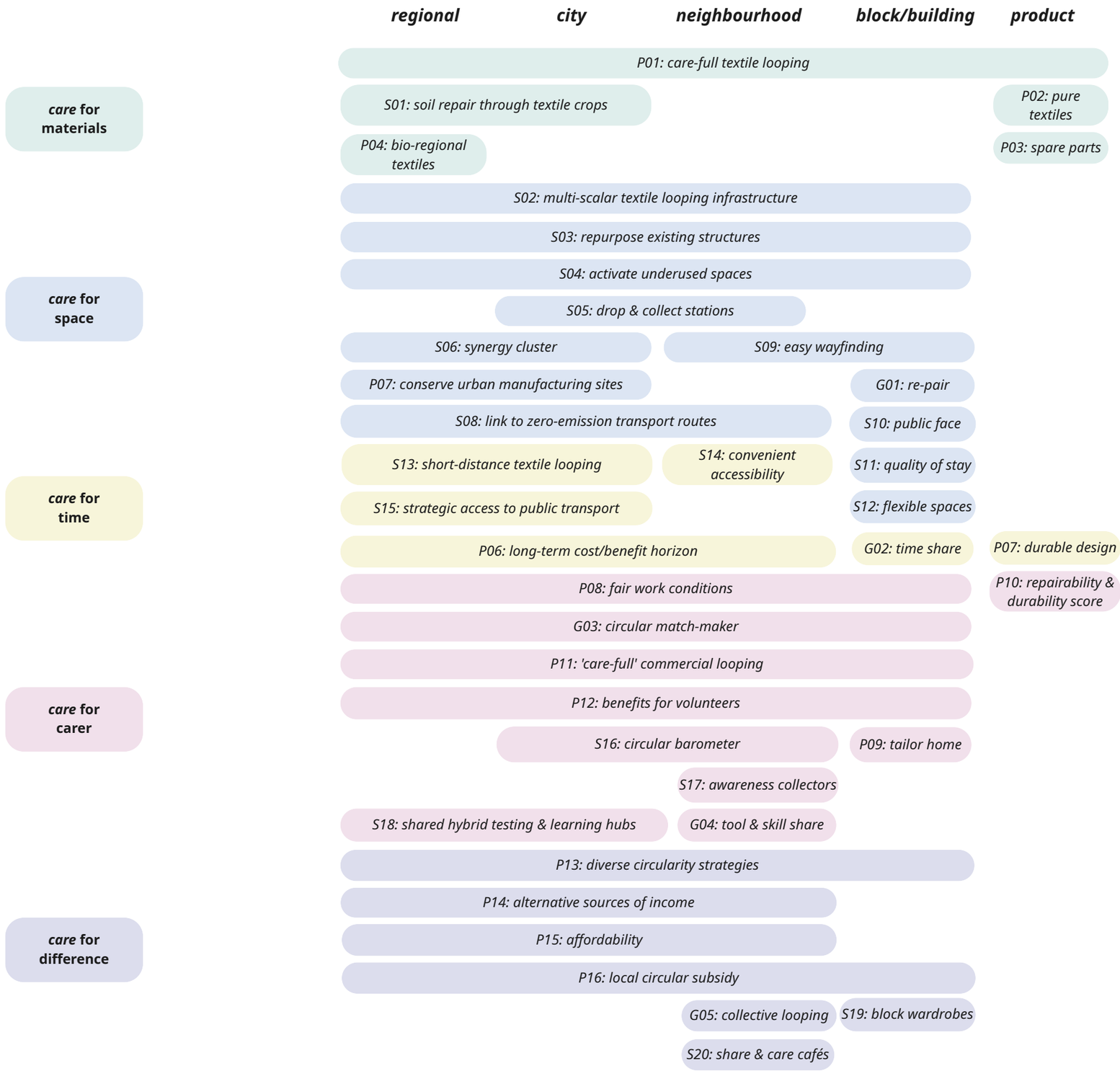


fig. 66 ***Pattern field organised by care aspect and implementation scale***
source // author

patterns

care for materials

P01 — **scale** *transscalar*

b △ ○

‘care-full’ textile looping

***Caring for space, time, materials, carers and differences when implementing textile looping practices** enhances their environmental and social impacts*

circularity

what is cared for?

space · time · materials · carer · difference

social foundation

links

- P02, P03, P06, P07, P11, G05, P13, P08,
+ P15, P16, P14, S02, P04, S01, G03

P03 — **scale** *product*

□ △ ○

spare parts

***Standardising the provision of spare parts for every new piece of clothing that is bought** enables easy and affordable repairs, while extending a textile's lifespan*

circularity

what is cared for?

time · materials · carer · difference

social foundation

links

- G04, P09, P08
+ G05, S20, S19, P15, G01

P04 — **scale** *region*

s △ ○

bio-regional textiles

***Incentivising the use of agricultural residues for textile production** closes bio-regional resourse cycles*

circularity

what is cared for?

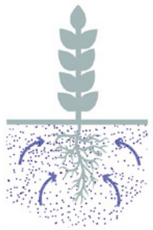
space · time · materials

links

- P01, P02, P11, S08
+ S01, S02, S06

S01 — **scale** *city - region*

■ △ ○



soil repair through textile crops

***Cultivating textile crops, such as hemp, on polluted land** can remediate the soil and reactivate these sites while producing bio-based textiles.*

circularity

what is cared for?

materials · space

links

- P02, P03, P06, P07, P11, G05, P13, P08,
+ P15, P16, P14, S02, P04, S01, G03

P02 — **scale** *product*

□ △ ○

pure textiles

***Standardising the material purity of every new piece of clothing that is produced regionally** enables low-emission recycling when it became unrepairable.*

circularity

what is cared for?

time · materials

links

- P01, P04, S02, S06, P07, S13, P08, P11

care for time

G02 — **scale** *building/block*

time-share

Sharing spatial facilities during different time periods via co-management *utilises temporarily underused spaces, while providing textile looping functions in accessible locations and connecting local carers*

circularity

what is cared for?

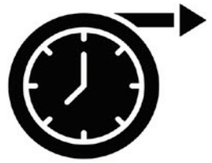
space · time · materials · carer · difference

social foundation

links

- P01, S04, S09, S10, S12, S14, P12
+ S02, S11, S13, G03, G04, G04, P11, S18, S20

P06 — **scale** *neighbourhood - city - region*



long-term cost/benefit horizon

Prioritizing long-term benefits over short-term costs *enables investments that unlock systemic, lasting economic, environmental, and social gains and accelerates circular transition efforts*

circularity

what is cared for?

space · time · materials · carer · difference

social foundation

links

- P01, S01, G05, S20, S19, P16, S17, S16, S18, P12, G03, S02, S03, S04, S05

P07 — **scale** *product*

durable design

Standardising durable clothing design *extends textile's lifespan, while reducing the need for frequent replacement and valueing material resources.*

circularity

what is cared for?

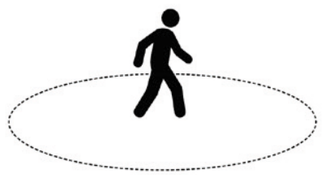
time · materials · carer · difference

social foundation

links

- P01, P02, P03, P04, P06, P11, P15
+ P13, G05, S19, S20

S14 — **scale** *neighbourhood*



convenient accessibility

Making circular textile options conveniently accessible near by public transport hubs or neighbourhood interest points *promotes local textile looping*

circularity

what is cared for?

space · time · materials · carer

social foundation

links

- G05, G01, G02, S20, S17, S19, P11, S15, S09, S05, G04
+ P16

S13 — **scale** *city - region*

short-distance textile looping

Providing spaces regionally for textile looping *reduces transport emissions, keeps resource values within the region, while keeping travels for workers short*

circularity

what is cared for?

space · time · materials · carer

social foundation

links

- P01, S02, S05, S15, S06, P07, P11
+ S03, S04, P16

care for space

S02

scale
neighbourhood - city - region

multi-scalar textile looping infrastructure

***A multi-scalar network of infrastructure for textile looping** enables textiles to be effectively looped within the region.*

circularity

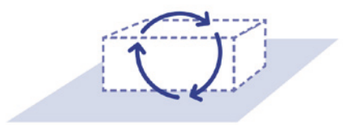
what is cared for?
space · time · materials

social foundation

links
- P01, S08, P07, S05, S06,
+ S03, S04, P11, G05

S03

scale
building - neighbourhood - city - region



repurpose existing structures

***Repurposing existing buildings and infrastructure that currently serve the linear economy** enables regional textile looping while reducing the need for new land development*

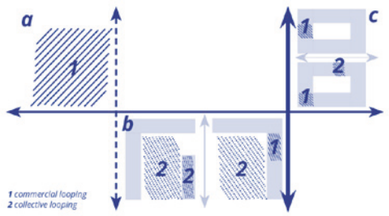
circularity

what is cared for?
space · time · materials

links
- P01, P07, S08, S12, P06, P15
+ P11, S02, S06, S13, G01, G05, S19, S20, S18
/S04

S04

scale
neighbourhood - city - region



activate underused spaces

***Activating underused spaces for looping activities through adaptive reuse** enhances socio-ecological revitalisation based on local needs and spatial conditions, while minimising land conversion at urban fringes.*

circularity

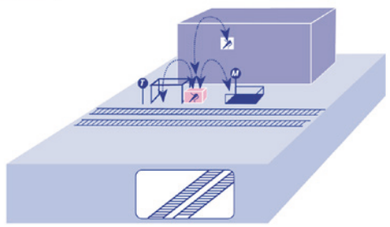
what is cared for?
space · difference · materials

social foundation

links
- P01, S12, P06, S08
+ G05, P11, G01, S06, S01, S13
/ S03

S05

scale
neighbourhood - city



drop & collect stations

***A network of stations for dropping & collecting repaired clothing** enables convenient textile repair and remaking for citizens through local (home) tailors and raises awareness.*

circularity

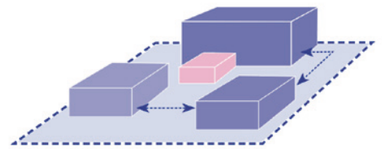
what is cared for?
space · time · materials · carer

social foundation

links
- S14, S13, P14, S08
+ P01, P09

S06

scale
region - city



synergy cluster

***Concentrating complementary textile activities** promotes innovation and collaboration through sharing of resources, infrastructure, skills, and knowledge, while shortening supply chains.*

circularity

what is cared for?
space · time · materials · carer

social foundation

links
- S08, S15
+ S18, S03, S04, S13, P04, G04, P01

P07

scale
city - region

conserve urban manufacturing sites

***Conserving industrial land use** ensures that spaces are available locally for textile looping activities.*

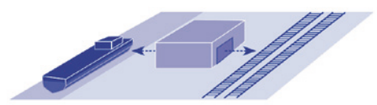
circularity

what is cared for?
space · time · materials

links
- P01, S13
+ S03, S06, S08, S02

S08

scale
neighbourhood - city - region



link to zero-emission transport routes

***Linking circular textile functions to water or railways** ensures a zero-emission circular transition within the region.*

circularity

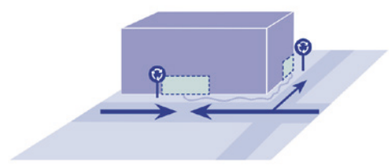
what is cared for?
space · time · materials

social foundation

links
- P01, P04, S02, S13, S13, P06, P11
+ S03, S04, S05, P07, S06

S09

scale
block/building - neighbourhood



easy wayfinding

***Strategic placement and clear way leading** improves wayfinding to promote the use of circular textile amenities by citizens.*

circularity

what is cared for?
space · time · materials

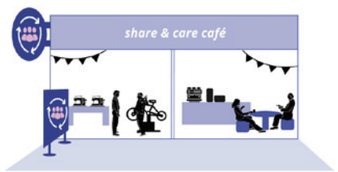
social foundation

links
- G05, P11, S10, S20
+ P16, S03, S04

care for space

S10 scale: block/building

c m △



public face

Visually permeable facades and standardised signage of circular facilities *enhance the legibility of their function to promote textile looping, while raising awareness.*

circularity

what is cared for?

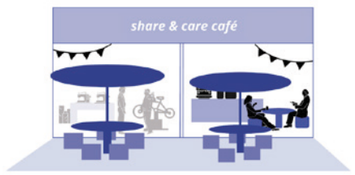
space materials carer

social foundation

links
- P01, G05, P11, G02, S18,
+ S09, P15,

S11 scale: building/block

□ ▲ ○



quality of stay

An inviting atmosphere in circular textile amenities *enhances spatial quality and fosters community building, while promoting textile looping.*

circularity

what is cared for?

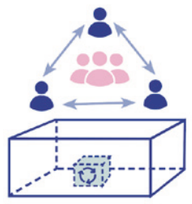
space difference time materials

social foundation

links
- G05, S20, P15
+ S12, P11, S18, S19, G01, S10, S05

G01 scale: block/building

□ ▲ ○



re-pair

Co-locating repair, reuse & rental of textiles with other functions *enables the shared use of space, while fostering community building, and making circular initiatives more accessible and integrated into daily urban life.*

circularity

what is cared for?

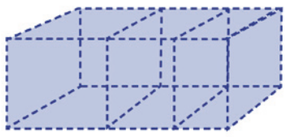
space time materials carer difference

social foundation

links
- S04, S09, S10, S12
+ G05, P11, G02, S11, S20, P16, S03

S12 scale: building/block

w c △ ○



flexible spaces

Spaces that are flexible *enable their reuse for different circular and community functions over time, while saving resources and enhancing resilience.*

circularity

what is cared for?

space difference time materials

social foundation

links
- P01, S20, S18, G05
+ S03, S04, G01, G02, G04, P11

care for difference

G05 scale: block/building - neighbourhood

s △ ○

collective looping

Promoting circular practices based on collective approaches *encourages higher r-strategies like reduce and reuse, while strengthening community bonds.*

circularity

what is cared for?

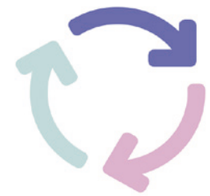
difference materials carer

social foundation

links
- P01, P06, P12, P15, S19, S20, S16,
S17, S12, S10, S11, S14, G03, G04
+ G01, G02, S02, S13, P03, P07, P10

P13 scale: country - region - city

b △ ○



diverse circular strategies

Implementing a diversity of circular strategies *promotes material looping while addressing differences in local communities and spatial conditions and capacities.*

circularity

what is cared for?

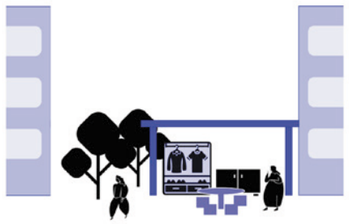
difference space materials carer

social foundation

links
- P01, G05, P11, S02, P06, P15, S13
+ P16, S19, S20, P14, S16, S17,
G04, S05, P07, S01, P04, S05,
S03, S04, P10, P07, P03, P02

S19 scale: block

s m ○



block wardrobe

Shared wardrobes in residential blocks *promote collective textile reuse, while addressing financial insecurity, raising awareness and improving neglected public spaces.*

circularity

what is cared for?

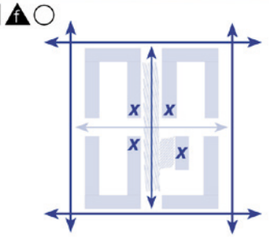
difference space carer materials

social foundation

links
- G05, S04, S14, S09, S11, P15, S12, S10
+ P06, P07

S20 scale: neighbourhood

c s ▲ ○



share & care café

Providing spaces centrally in neighbourhoods where clothes can be exchanged and repaired collectively *encourages local textile looping and skill & knowledge sharing, while strengthening community bonds.*

circularity

what is cared for?

difference space carer materials

social foundation

links
- S14, G05, S09, S11, S12,
P12, P08, G04, P15
+ S04, S03

care for difference

P15 scale: block - neighbourhood - city

affordability

Ensuring affordable textile looping practices and services *promotes material circularity, ensures equal distribution of options in the city, while addressing socio-economic inequalities.*

circularity

what is cared for? difference, space, materials, carer

social foundation

links
- P01, P16, G05, P11, P06 + S20, S19, G04, P09

P14 scale: neighbourhood - city - region

alternative sources of income

Providing alternative sources of income for carers *that drive textile circularity with their actions addresses economic inequalities and promotes textile circularity.*

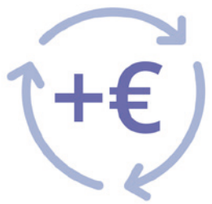
circularity

what is cared for? difference, materials, carer

social foundation

links
- P01, P09, P15, P11

P16 scale: neighbourhood



local circular subsidy

Subsidising initiatives that provide circular textile practices locally *promotes closing textile loops in short distances reducing transport -related emissions.*

circularity

what is cared for? difference, space, materials, carer

social foundation

links
- P01, P06, G05, P11, S13, S14, S10, G01, P09, G03, G04, S20, P15

care for carer

S17 scale: neighbourhood

awareness collectors

Providing interactive collection points in neighbourhoods *promotes responsible disposal habits and fosters community engagement and a sense of shared responsibility.*

circularity

what is cared for? materials, carer

social foundation

links
- P01, S14, S09, S10, S11 + P11

P09 scale: block/building

tailor home

Encourgaing tailoring and repair services for clothes in homes *extends the lifespan of textiles, while offering an alternative income and affordable tailoring.*

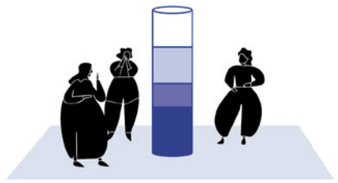
circularity

what is cared for? materials, carer, difference

social foundation

links
- P14, P16, S05, S12 + G04, S20, P03

S16 scale: neighbourhood - city



circular barometer

Placing circular barometers showing the progress of texile circularity of the city in busy public spaces *raises awareness about textile circularity and creates a feeling of collective respoinsibility.*

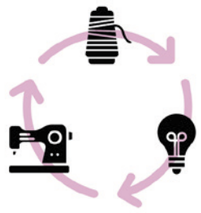
circularity

what is cared for? materials, carer

social foundation

links
- P01, G05, S14, S09, S10

G04 scale: neighbourhood



tool & skill share

Support tool & skill sharing models *to boost individual and collective capacity for repairing and re-making clothes, while strengthening community bonds.*

circularity

what is cared for? materials, carer

social foundation

links
- S20, P15, S18, P12 + P09

care for carer

P08 scale: transscalar

c △

fair work conditions

Ensuring decent work conditions for circular workers *recognises their essential contribution to achieving broader societal goals and is fundamental to a socially just circular transition.*

circularity

what is cared for? materials, carer

social foundation

links
- P01, S15, S06, P06 + S18, G04

P12 scale: transscalar

□ f

benefits for volunteers

Giving benefits to volunteers *recognises their value, sustains motivation, and attracts a diverse range of participants, ensuring the long-term viability of volunteer-driven projects.*

circularity

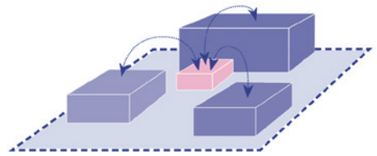
what is cared for? difference, time, materials, carer

social foundation

links
- P01, S20, P16, P15, P06 + G05, G04

S18 scale: city - region

□ △ ●



shared hybrid testing & learning hubs

These hubs serve as bridges *between industry, academia, vocational schools, and local communities, accelerating innovation while training the next generation of textile care professionals.*

circularity

what is cared for? difference, space, materials, carer

social foundation

links
- P01, S02, S06, P07, S11, S10, S12 + S03, S04

P11 scale: transscalar

b △

'care-full' commercial looping

Strategically promoting circular businesses that follow higher r-strategies *like reuse, repair & re-making, drives a zero-emission textile transition, while creating local jobs.*

circularity

what is cared for? materials, carer

social foundation

links
- P01, P08, S10, S09, S12, S13, S15 + S11, S04, S03 / G05

P10 scale: product

□ △

repairability & durability score

A score indicating the repairability and ***durability of a clothing item*** *provides consumers with transparency and raises awareness about the expected lifespan, ease of maintenance, empowering to make more informed and sustainable purchasing decisions.*

circularity

what is cared for? materials, carer

social foundation

links
- P01, P02, P03, P07

G03 scale: transscalar

c △

circular match-maker

The circular match-maker supports carers *by aligning interests, fostering partnerships, identifying needs, sharing information, and safeguarding community priorities.*

circularity

what is cared for? materials, carer

social foundation

links
- P01, S02, S06, P07, S11, P08, G04, S18, P16

‚care-full' circular textiles in the MRA - a spatial vision & strategy

VI

How can ‚care-full' circular strategies be spatially facilitated in the Metropolitan Region Amsterdam?

This chapter explores how the proposed interventions formulated in the pattern language can be spatially implemented into the existing regional and urban landscapes, as well as their potential influence on the socio-ecological conditions of local systems.

roadmap
policy goals & milestones

The national government, the region, and the municipality of Amsterdam have set the goal of achieving a fully circular economy for all sectors, including the textile sector, by 2050. In 2020, Amsterdam has decided to build a circular economy that follows the doughnut model (Raworth, 2017), therefore staying within environmental limits and protecting the social foundation of the city and thus the well-being of its citizens. This existing timeline will be a guideline for the vision & strategy for a ‚care-full' circular textile value chain in the MRA.

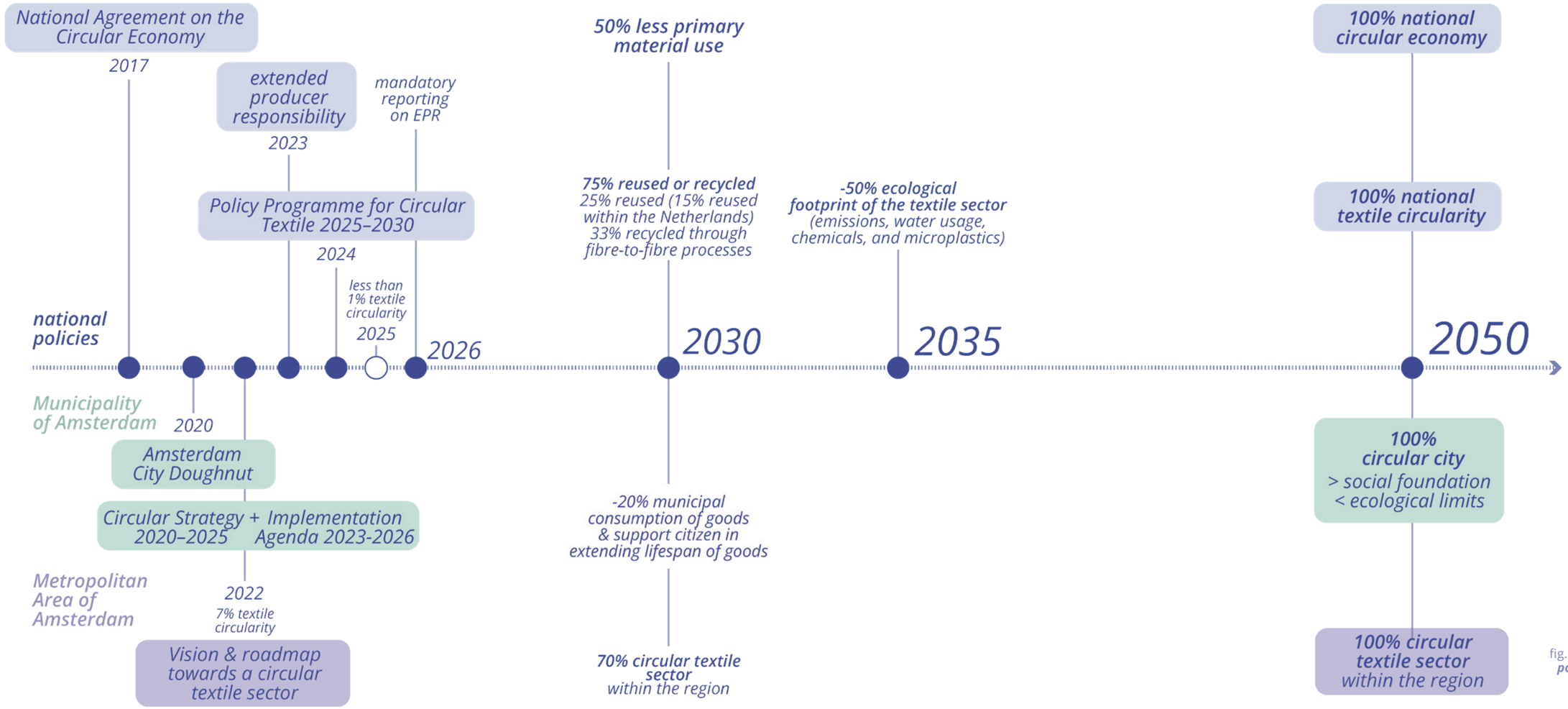


fig. 67 ***Overview of relevant policies and strategies for circular textiles***
source // author

what if we integrate more care (for *) in the circular transition of the textile industry in the MRA?

In order to achieve the circularity goals set by national, regional and local governments this chapter presents a cross-scale vision and strategy based on the developed pattern language around the five aspects of care for the circular textile transition.

vision statement
By 2050, the Metropolitan Region Amsterdam will position itself as a global frontrunner in advancing a 'care-full' circular textile sector - demonstrating how spatial planning grounded in care can meaningfully contribute to restoring ecological balance and strengthening social foundations, both locally through direct action and globally through systemic influence. This vision is grounded in the principles of spatial, social, and ecological justice. It promotes a systemic transition guided by care for materials, space, time, the people that actively work in sustaining circular practices, and the differences that shape diverse communities.
Through spatial planning, policy alignment, and inclusive governance, circularity will be embedded not only as a technical process, but as a socio-ecological value woven into the urban fabric.

This will be realised by six ‚care-full' main actions:

* ***Developing a multi-scalar network of circular infrastructure*** that facilitates textile collection, sorting, storage, reuse, repair, remaking, and recycling.

* ***Connecting this network via zero-emission transport routes*** to ensure short-distance and low-impact logistics.

* ***Creating inclusive, dignified employment opportunities*** across the circular textile value chain.

* ***Fostering a dynamic knowledge and innovation ecosystem*** to continually adapt and strengthen circular practices.

* ***Addressing local differences in communities*** by harnessing potentials through diverse textile looping strategies.

* ***Overall facilitating a closed textile loop*** within the region, supported by bio-regional production.

fig. 68 ***Regional vision map***
source // author

‚care-full' cross-scalar looping
conceptual approach

What does this vision mean at different scales?

1. *what if care-full textile looping enhances the livability for residents in Amsterdam's neighbourhoods?*

By rethinking circular practices through collective textile looping and providing neighborhood-scale infrastructure, residents gain convenient access to reuse, repair, and remake services within a short distance. This approach not only reduces textile consumption but also fosters stronger community ties, supports local skills, and enhances the overall livability and resilience of Amsterdam's neighborhoods.

2. *what if textiles are looped locally?*

Localizing textile loops slows down the flow of materials by repurposing existing commercial and industrial sites across the city for sorting, storage, repair, and remaking. Preserving urban manufacturing sites - despite development pressures - ensures that essential circular activities remain embedded in the city, supporting sustainable production and reducing the need for long-distance transport

3. *what if the region supports this local loop?*

A supportive region enables the closure of local textile loops by integrating complementary industries into synergistic clusters, dismantling outdated linear infrastructures, and promoting zero-emission transportation via rail and waterways. These measures reinforce local circularity while scaling up environmental and economic benefits across the metropolitan area.

The time-model approach shown in fig. 69 for the multi-scale looping system of textiles was developed in an iterative process throughout the design of the strategy and is based on the spatial potentials found in the region, city and pilot neighbourhood. It is centered around the patterns of ‚short- distance tetxile looping' and ‚convenient accessibility'. The potentials for implementing the spatial functions for textile looping were found to enable looping in a 5 minute, a 15 minute and a 30 minute radius with textile flows across the scales.

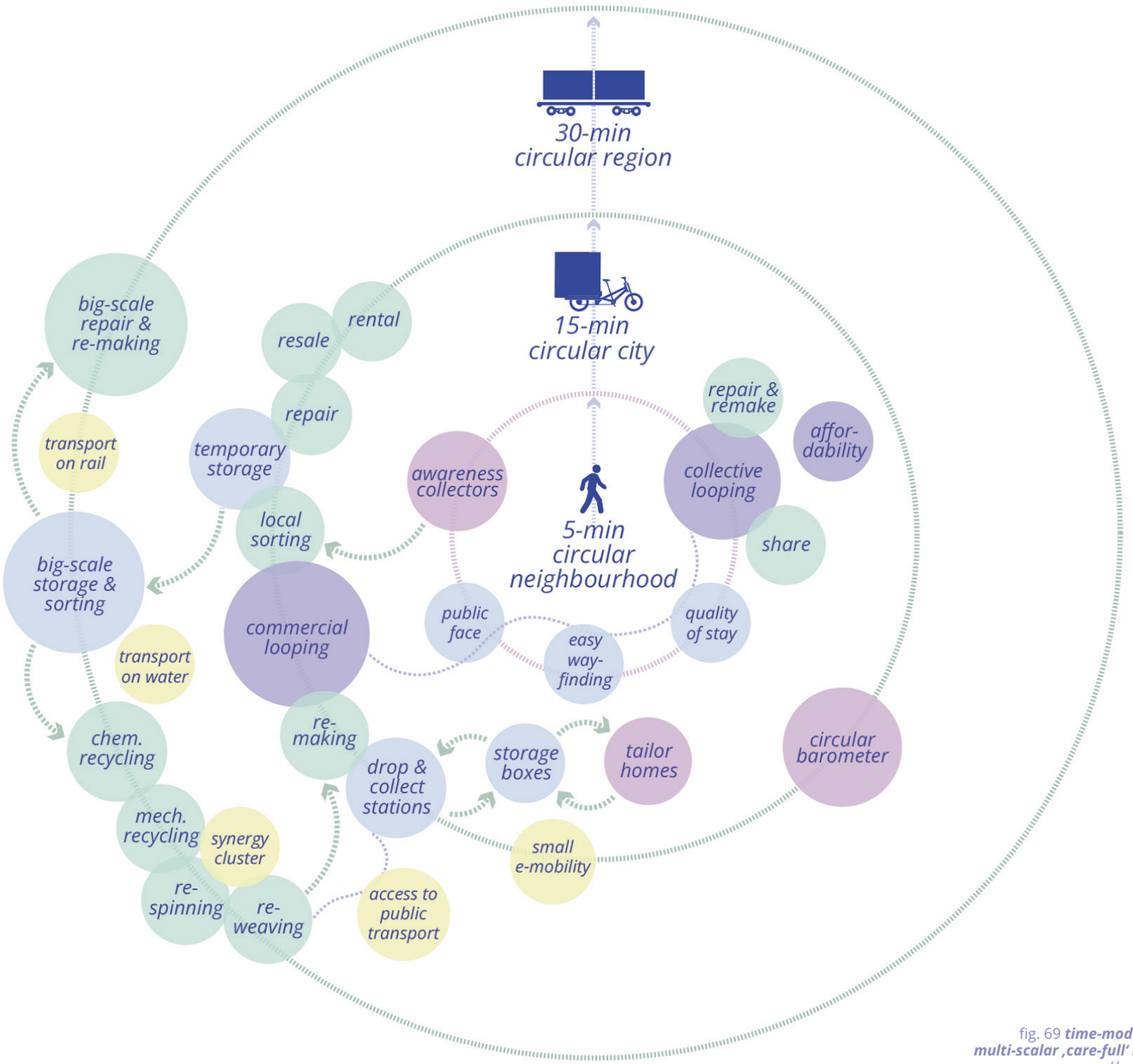


fig. 69 ***time-model for multi-scalar ‚care-full' loops***
source // author

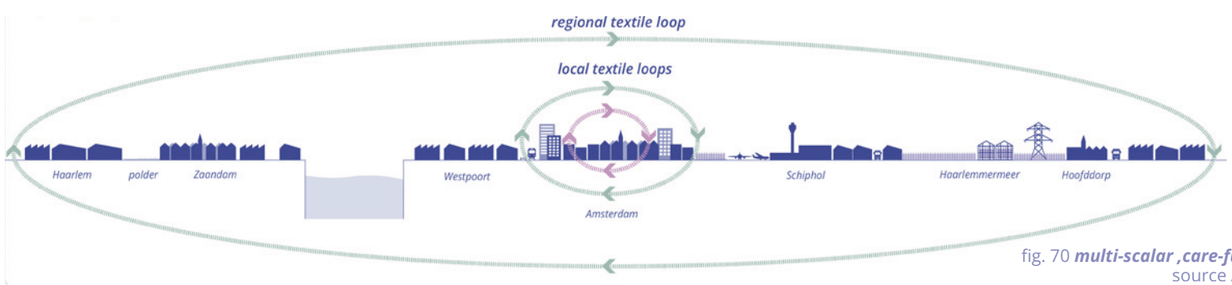


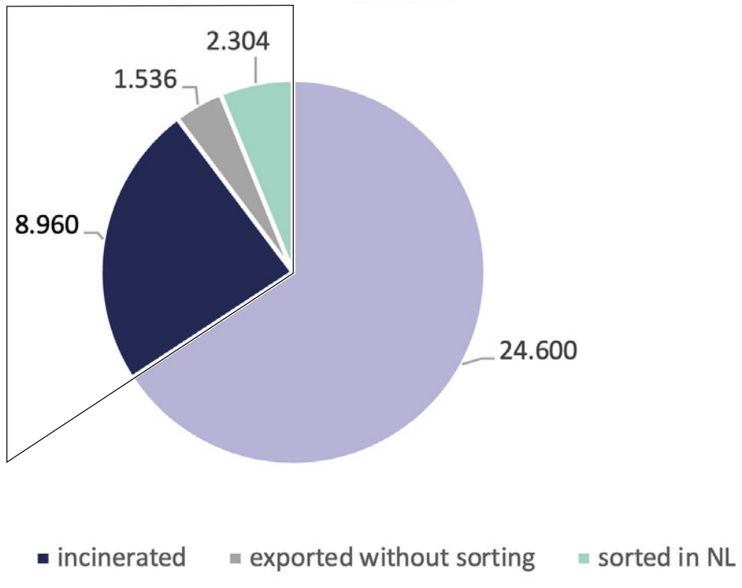
fig. 70 ***multi-scalar ‚care-full' loops***
source // author

Amsterdam's wardrobe
now and in the future

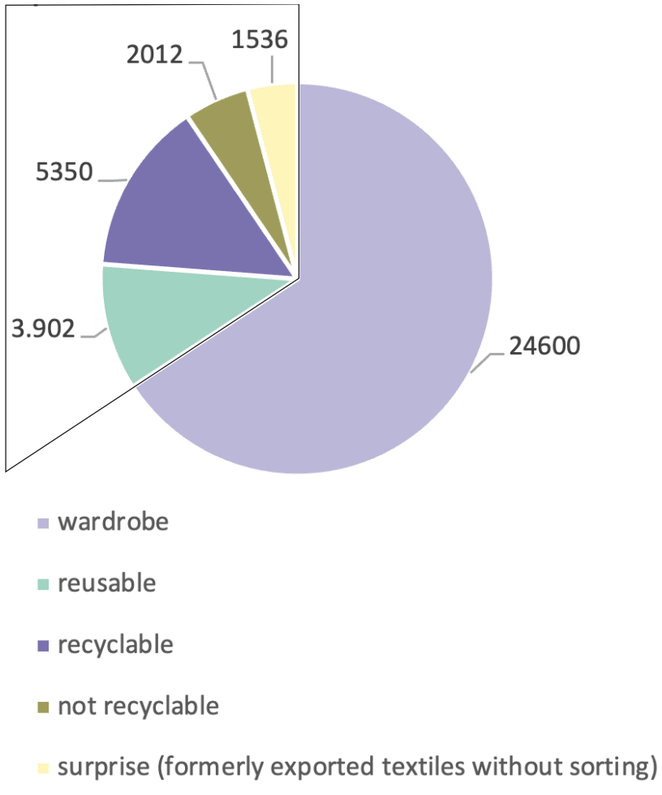
Amsterdam's current wardrobe (total amount of clothing in the city) is characterized by high annual disposal and incineration rates (fig. 71). However, the current wardrobe has more potential for circularity (fig. 72). The ‚care-full' transition envisions using the current potential by reusing what can be reused, recycling what can't be reused, and remanufacturing what can't be recycled. However, in the future, by 2050, the goal is to shift to a higher percentage of higher circular strategies such as reuse, repair, and re-making (fig. 73).

current wardrobe // 2025

=12.800t discarded annually *(+ 23.000t of discarded textiles in MRA)*



potentials of the current wardrobe // 2030



future wardrobe // 2050

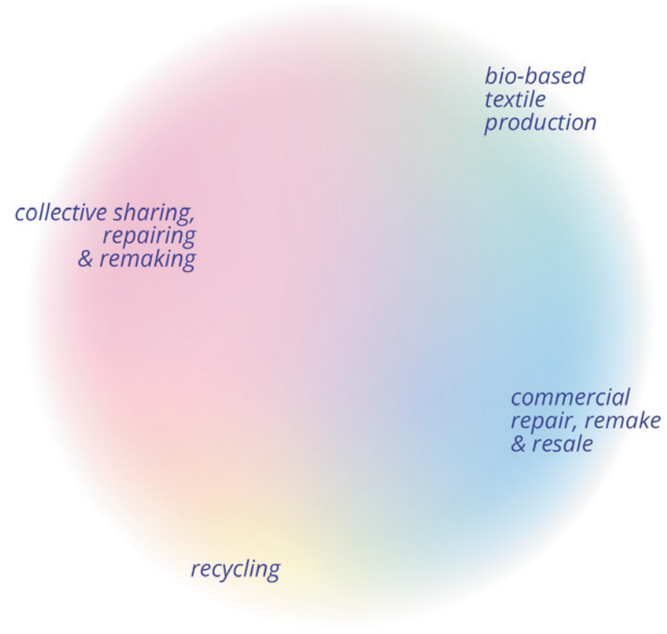


fig. 71 ***shares of current practices applied to current textile waste***
source // author, data based on (Amsterdam Economic Board, 2020 & 2022)

fig. 72 ***shares of potential practices applied to current textile waste***
source // author, data based on (Amsterdam Economic Board, 2020 & 2022)

fig. 73 ***envisioned (blurry) shares of circular practices in Amsterdam's wardrobe for 2050***
source // author

regional scale
section with challenges

Within the Metropolitan Region of Amsterdam textile flows are currently mostly linear going through the port, due to high import and export rates of both newly produced clothing and discarded products. The goal of the 'care-full' regional and local strategy is therefore to explore how textile circularity could be spatially facilitated within the capacities and conditions at hand. The developed pattern language will be used to redesign material flows, land use and programming according to the five aspects of care to address the challenges.

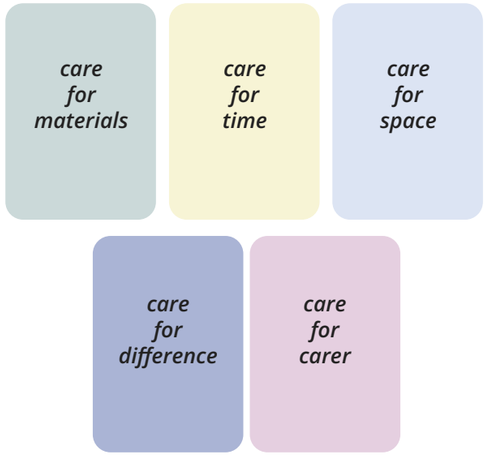
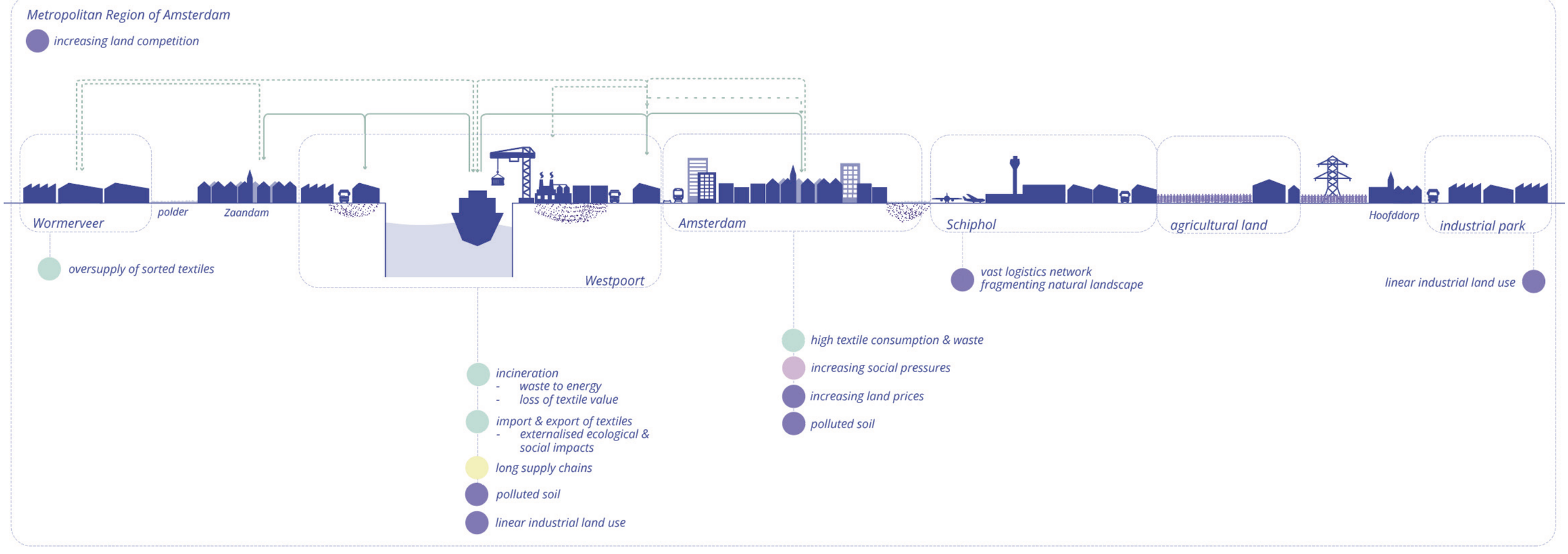


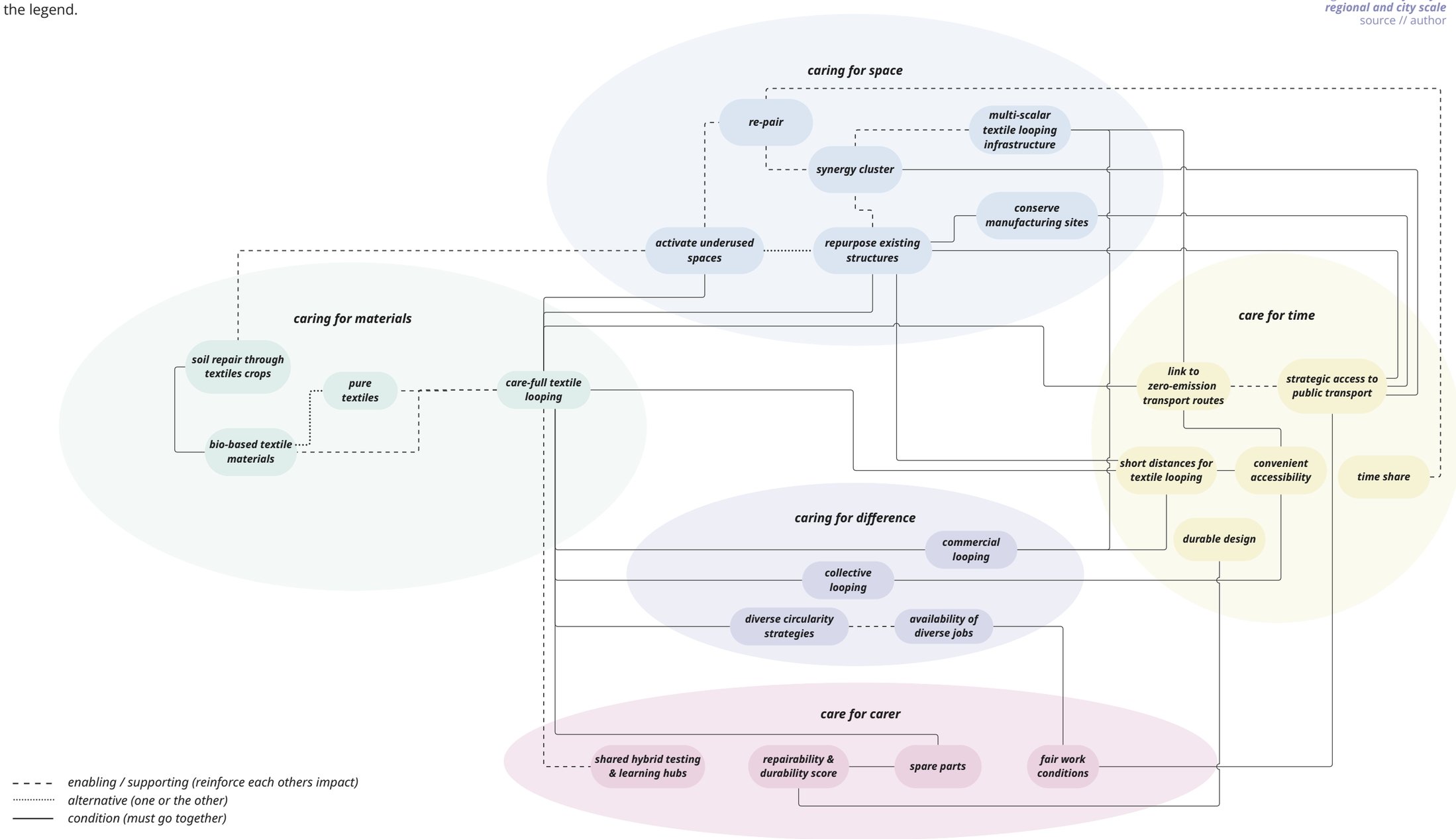
fig. 74 ***Systemic flow section with challenges from analysis***
source // author



patterns for a ‚care-full' textile ecosystem
at the region & city scale

The pattern field, which shows the different links between the patterns at regional and city scales, was generated before and adapted throughout the design phase. The links have different values, as shown in the legend.

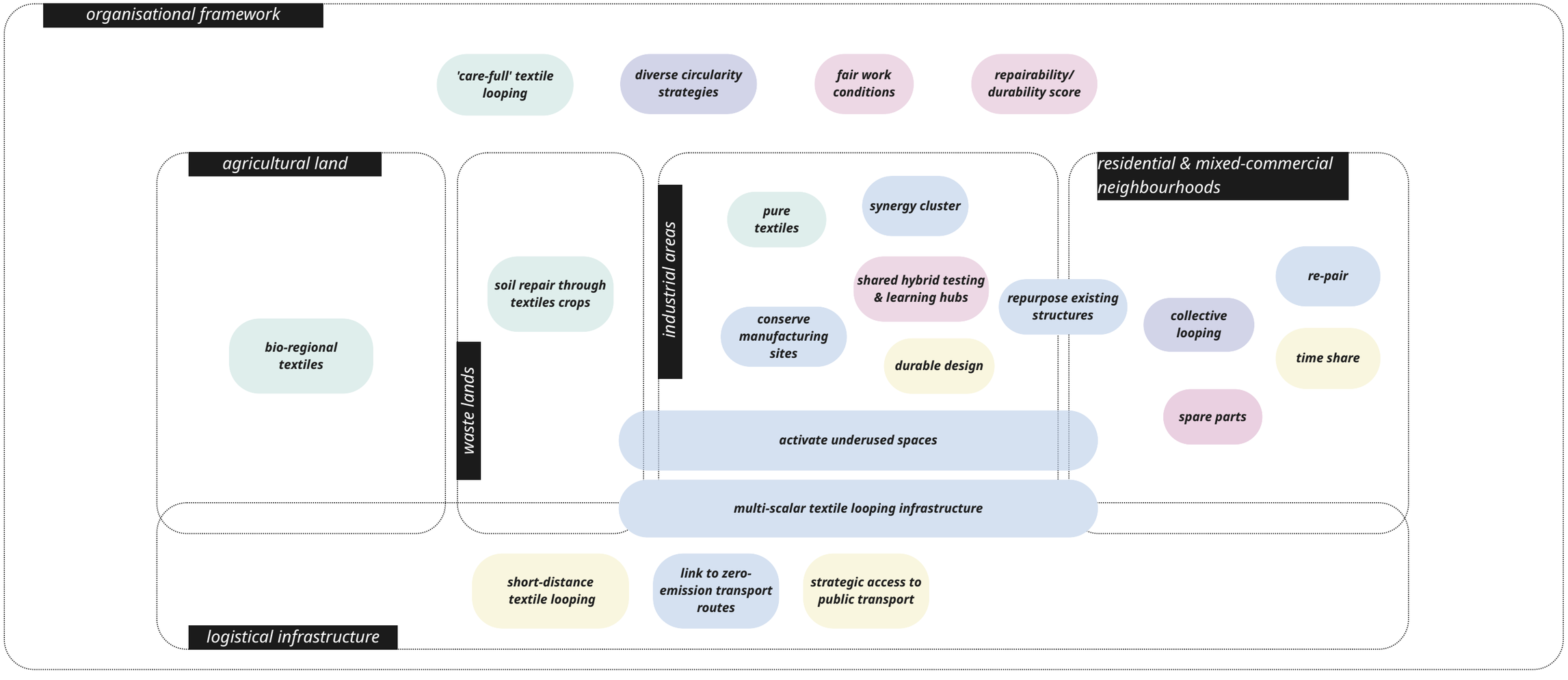
fig. 75 ***Pattern field for regional and city scale***
source // author



patterns across space types
on the region & city scale

This pattern field shows patterns for the regional and city scales, distributed across the different spatial typologies identified in the region, to inform the design. The next step involved exploring the potential for implementing the respective patterns before concluding the regional and local spatial strategy.

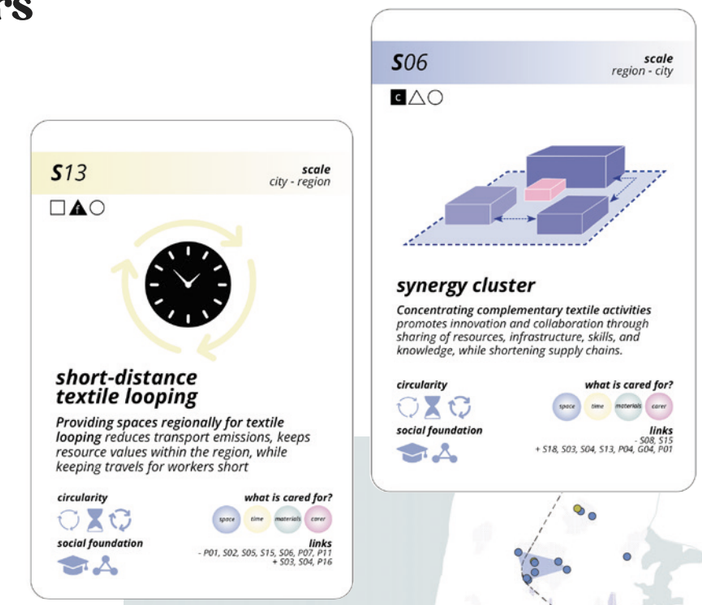
fig. 76 ***Pattern field showing spatial distribution of patterns***
source // author



existing textile clusters
regional potentials

In order to assess regional potentials for shortening the distances of textile looping existing textile industries around Amsterdam were mapped. The goal was to identify existing clusters of companies and activities to build as a base for new circular synergistic clusters.

The map shows locations of companies in the clothing or textile manufacturing sector. After conducting a random check of data points I found out that the data mostly show where companies that relate to textile activities are located, however not necessarily their manufacturing sites. The findings of the textile material flow analysis (page 65) showed that 98% of the clothes in Amsterdam are produced abroad, suggesting that there is no big-scale clothing production in the region. Nevertheless, these companies supposedly have knowledge in their respective activities and can be the base for developing regional production clusters.



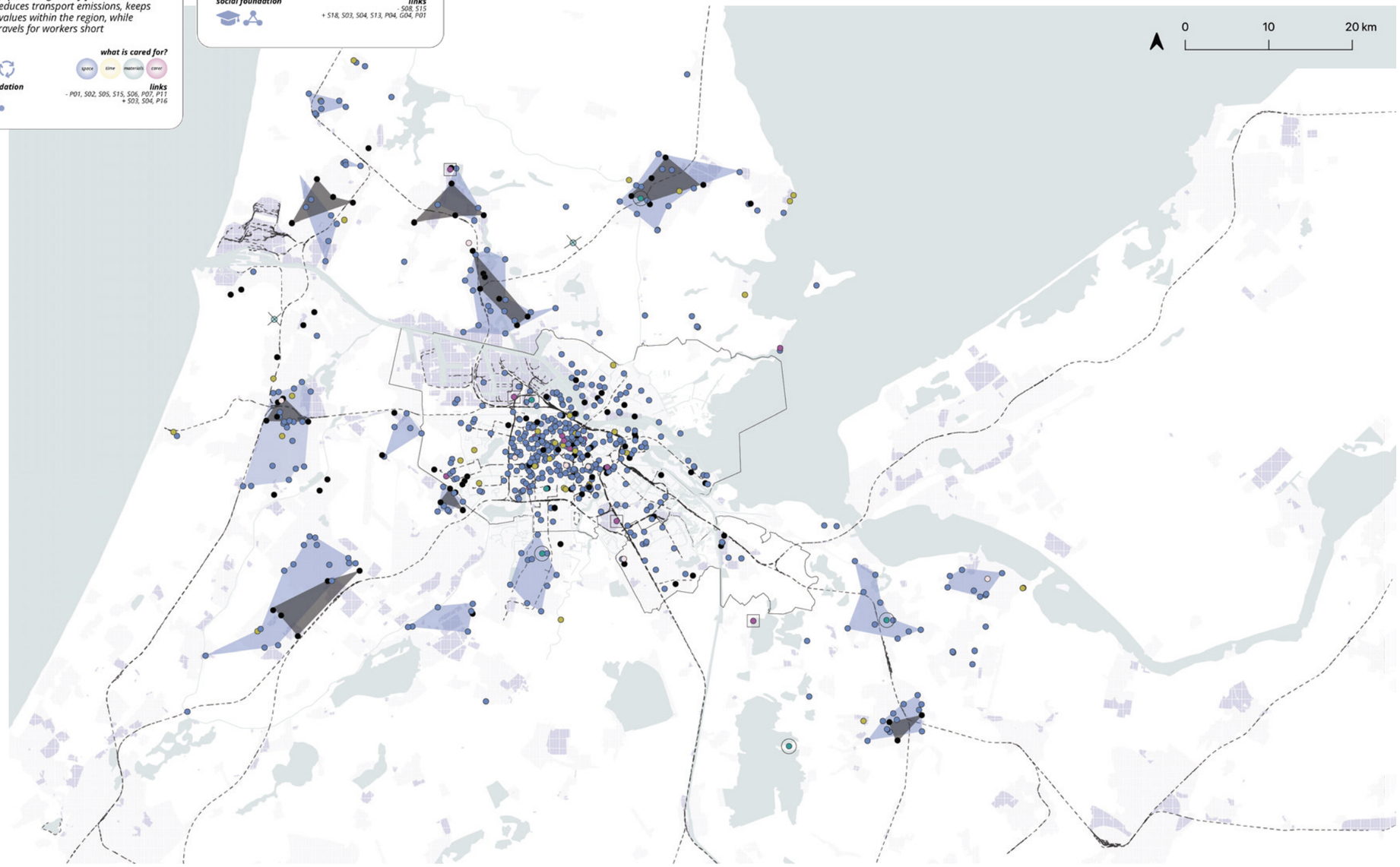
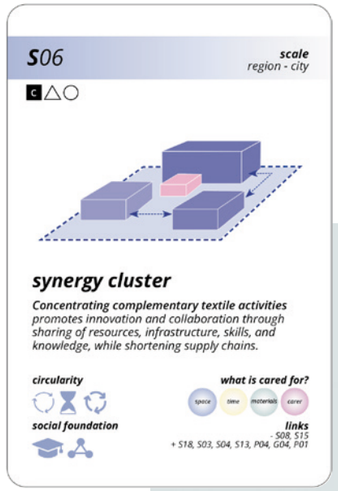


fig. 78 ***Textile companies in the region***
source // author, based on data from Stichting LISA (2024)

existing waste processing facilities
regional potentials

There is one fibre-to-fibre recycling factory that just opened in the Port of Amsterdam which will be able to recycle 2.5 million kilos of regional textile waste annually, and one automated textile sorting plant located in Wormerveer in the north of Amsterdam.



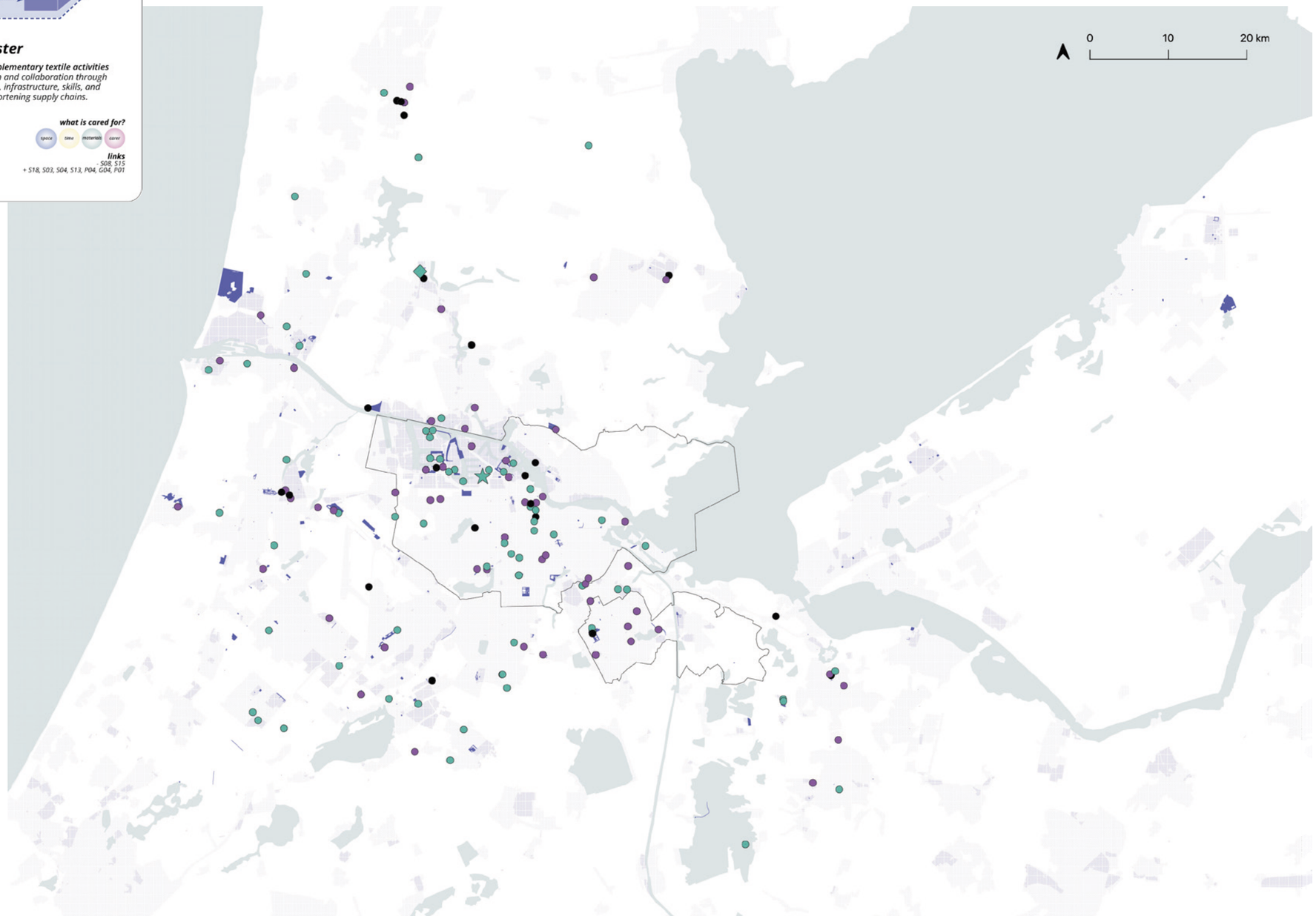


fig. 79 ***Waste processing facilities***
source // author, based on data from from Stichting LISA (2024)

- *waste processing sites*
- *collection of non-hazardous waste*
- *treatment facility of non-hazardous waste (processing of mixed waste, including residual waste, for disposal or further processing)*
- *materials recovery facility (processing of segregated recyclable materials)*
- *textile recycling*
- *textile sorting*

existing industrial sites
regional potentials

To identify potential spaces for industrial circular textile activities, existing industrial areas were mapped. Additionally, in line with the goal of establishing a circular textile value chain supported by zero-emission transportation, industrial areas directly connected to waterways and/or railways were identified as potential locations. Furthermore, sites and spatial structures of the oil and coal industries that require dismantling in line with EU and national CO2-neutrality goals and the Amsterdam port authorities' coal-free by 2030 goal were mapped.

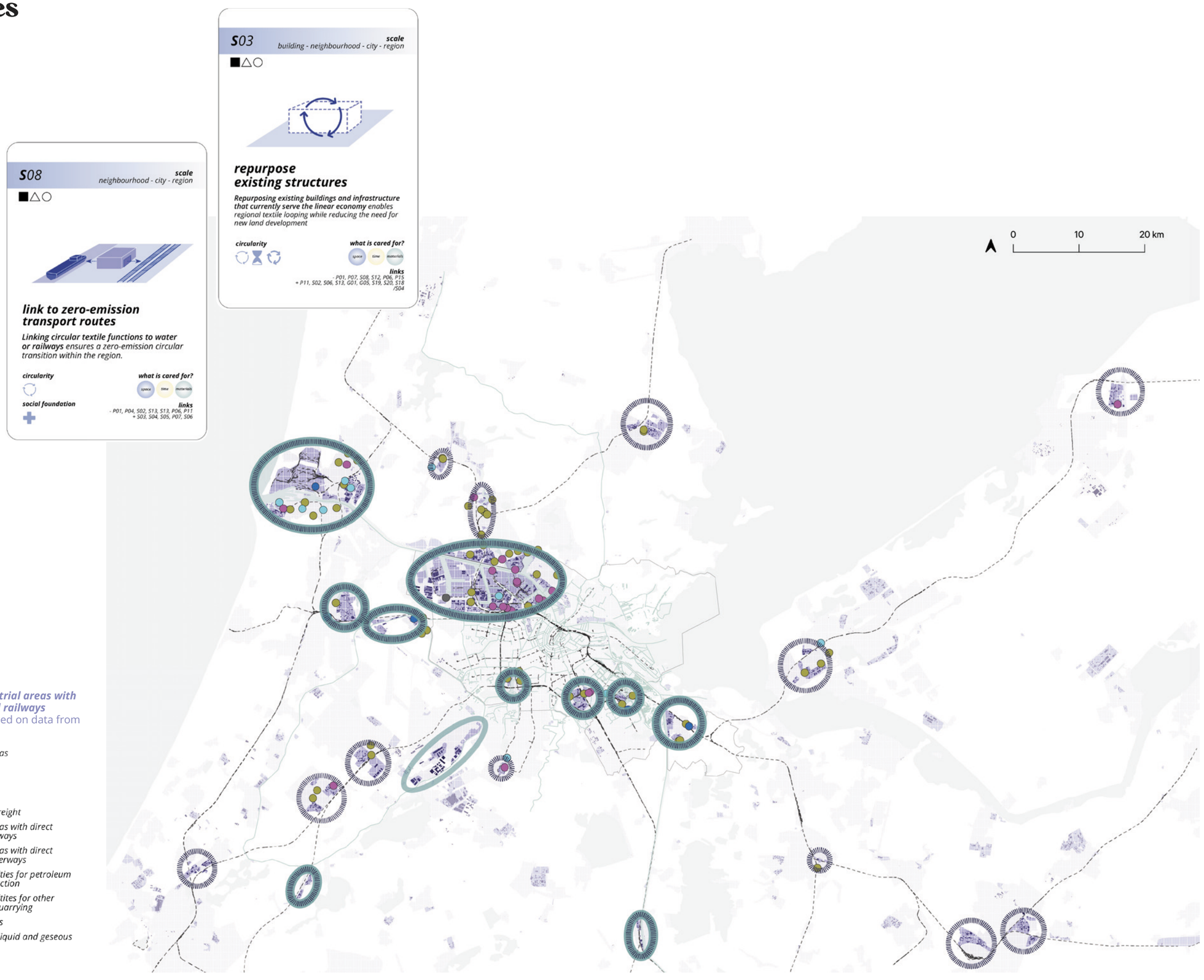


fig. 80 ***Existing industrial areas with access to water- and railways***
source // author, based on data from Stichting LISA (2024)

bio-based textile fibres
potentials

There is a potential to produce clothing out of bio-based fibres, so called cellulosic regenerated fibres (CRF), ***from agricultural residues.***

For example, high-purity cellulose can be extracted from cereal (e.g. wheat) straw through the lyocell process (fig. 81).
Other agricultural residues such as grass, hay, hemp, flax or plant residues from tomatoes, potatoes, grain maize, or winter wheat can also serve as a novel source of cellulose (1).
There is a few research and innovation projects across Europe that try to scale up the production of CRF to an industrial scale. These include the CRF-Sraw project in Hamburg Germany funded by the German Federal Ministry of Food and Agriculture, the BioBoost and CITYLAB 010 tomato T-shirt-project in Rotterdam (fig. 82), and the start-up fibe in London making clothing out of potato harvest waste.

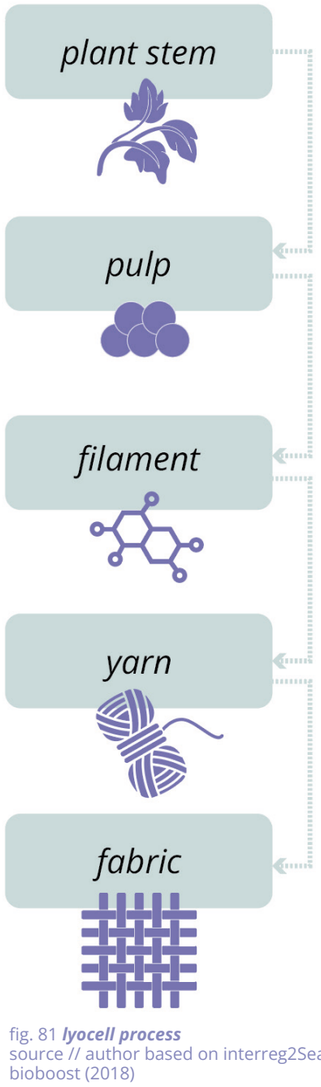


fig. 81 ***lyocell process***
source // author based on interreg2Seas & bioboost (2018)

fig. 82 ***lyocell process results of tomato t-shirt case study***
source // author based on interreg2Seas & bioboost (2018)

bio-based textile fibres
national potentials

Firstly, to assess the potential of bio-based textile production from agricultural residues, the importance of the region in terms of agricultural production was compared to the national scale. According to the numbers of food manufacturing sites (fig. 83) and the area of land used for horticulture of vegetables (fig.84) the province of North Holland ranks as one of the highest in the country. The maps (fig. 86) show that there is greenhouse clusters south and north of Amsterdam. Furthermore, potatoes, wheat and grain maize, the plants with the highest yield of organic matter for textile fibre production (Selin Norén at al., 2022) are cultivated in the northern and southern part of the province (fig. 87).

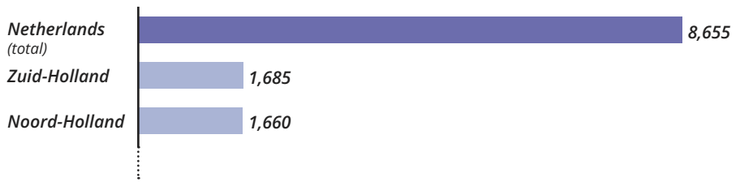


fig. 83 ***Number of food manufacturing sites in the Netherlands in 2023, by province***
source // author, based on Statista

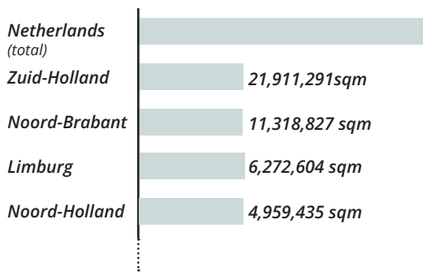


fig. 84 ***Area of land used by horticulture producing vegetables in greenhouses***
source // author, based on CBS

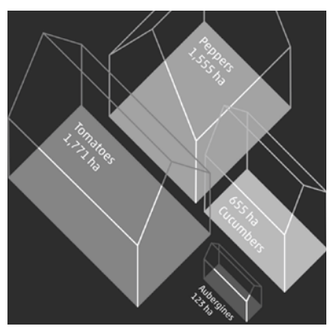


fig. 85 ***most grown types of vegetables in greenhouse horticulture***
source // author, based on CBS

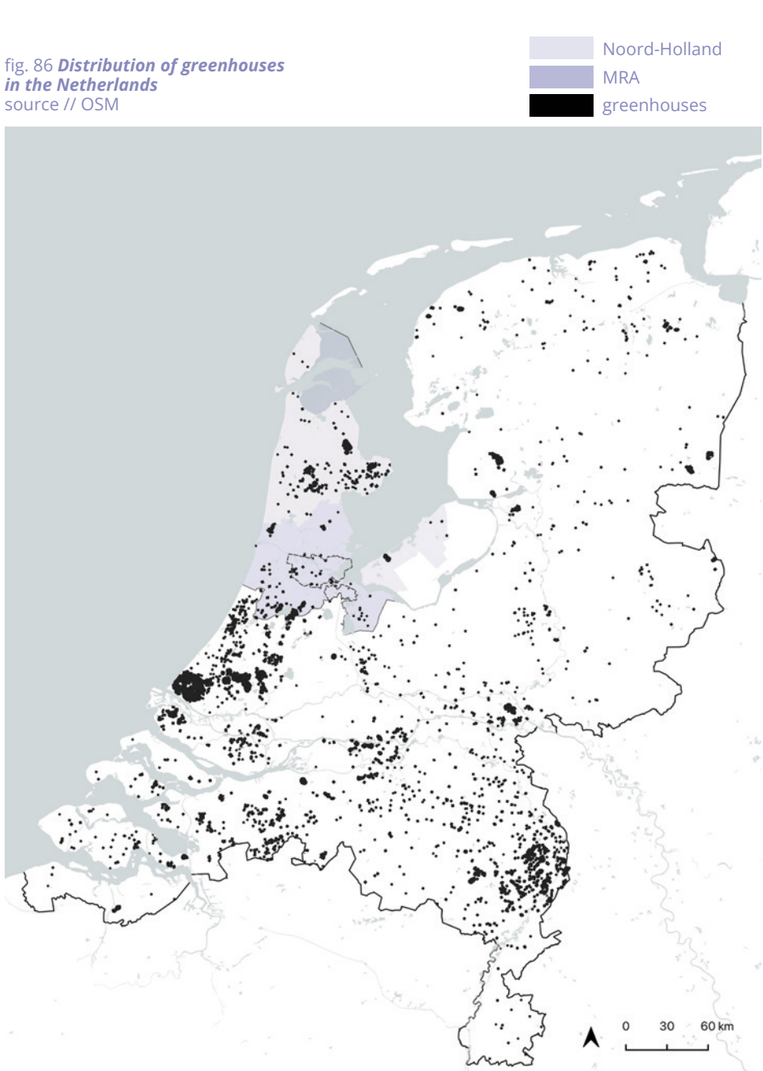


fig. 86 ***Distribution of greenhouses in the Netherlands***
source // OSM

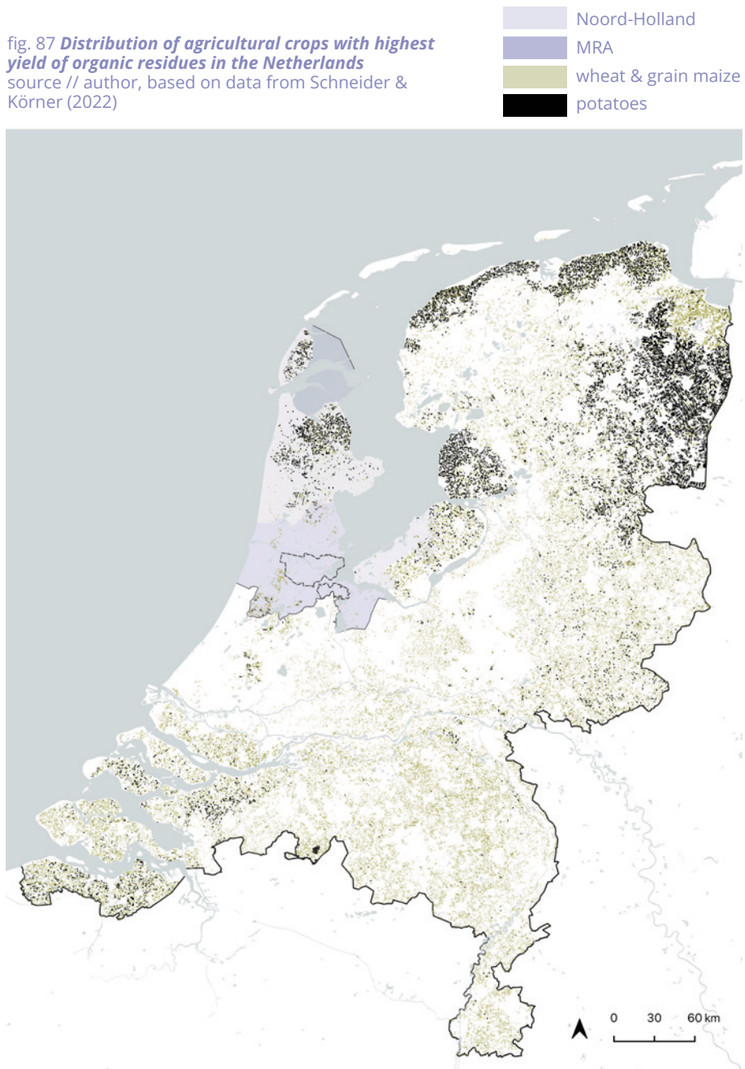


fig. 87 ***Distribution of agricultural crops with highest yield of organic residues in the Netherlands***
source // author, based on data from Schneider & Körner (2022)

bio-based textile fibres
regional potentials

There are three agricultural areas of significance for the province near Amsterdam. The horticulture in greenhouses in Haarlemmermeer (1) accounts for 10% of Noord-Holland's total horticultural area, while the horticulture in the open in Zuidelijke IJsselmeerpolders (2) and the greenhouse horticulture in Amstelland and Aalsmeer (3) both respectively for around 20% account (CBS, 2025).
Overall, this area is assessed as a potential source for agricultural residues for bio-based textile fibre production within the region. Nevertheless, for a scaled-up production sourcing from other regions should be considered. The calculation of the profitability of this business case was out of the scope of this study.

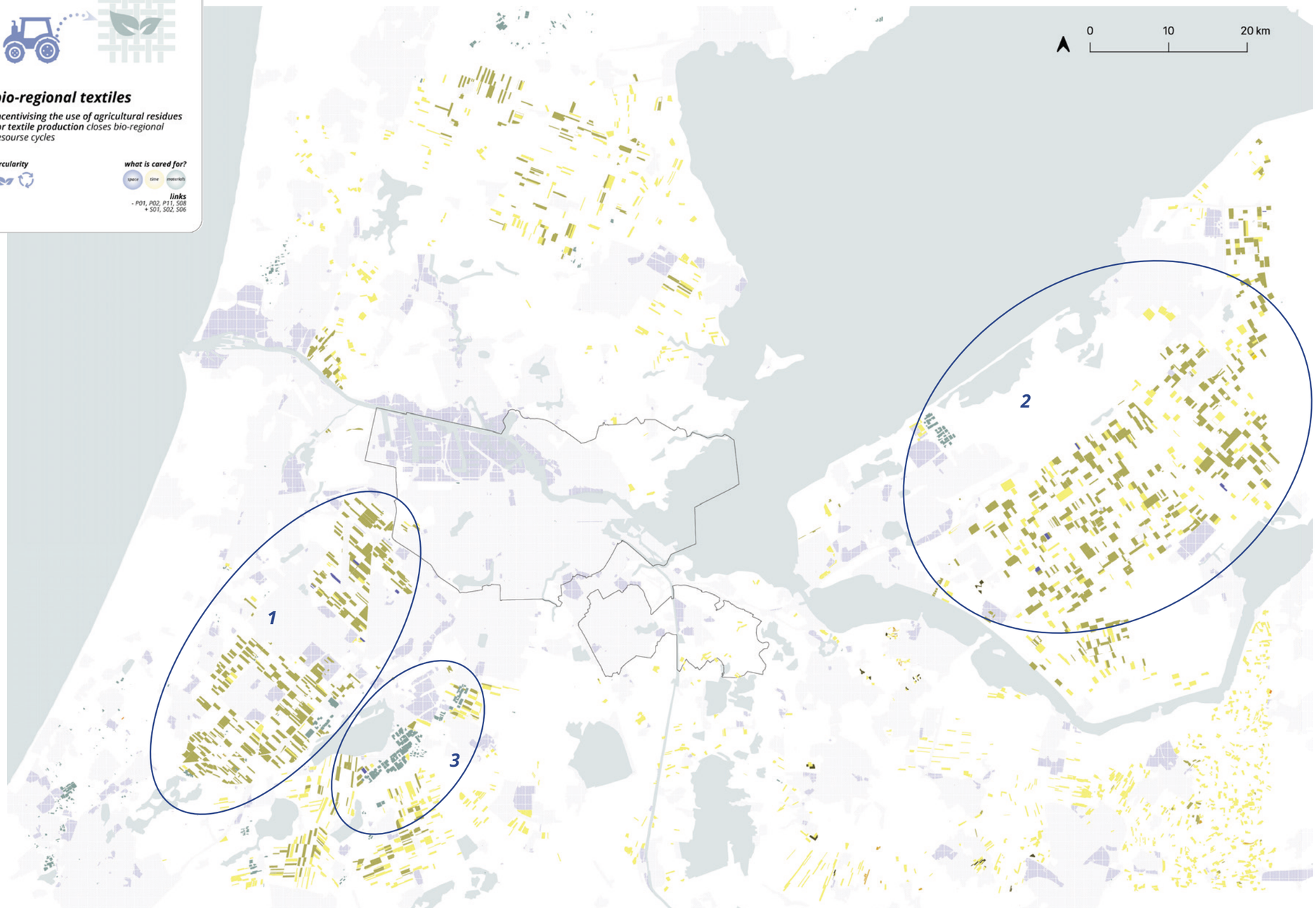


fig. 88 ***Distribution of fields with highest yielding crop types in the region***
source // author, based on data from Schneider & Körner (2022)

- *corn*
- *wheat*
- *flax*
- *rye*
- *greenhouses*

waste scapes
regional spatial potentials

There is polluted land within the port area and on the outskirts of Amsterdam which is currently unused. This land could be remediated through hemp cultivation (Placido & Lee, 2022). After a few growing seasons, the soil will have regenerated and the hemp can be used for textile production.

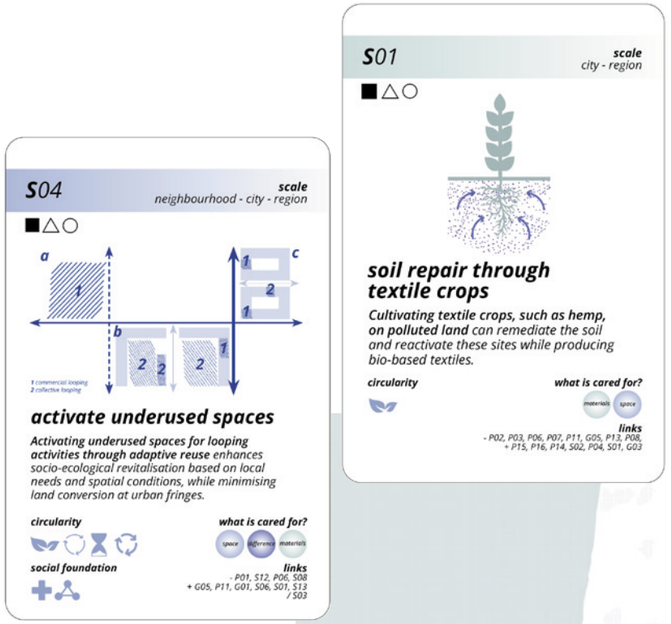


fig. 89 ***Process of remediating polluted land***
source // author

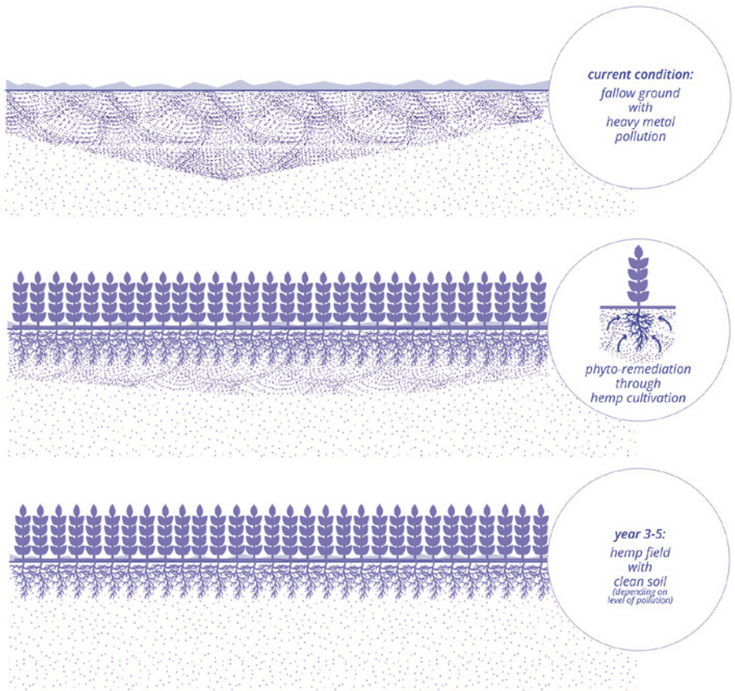
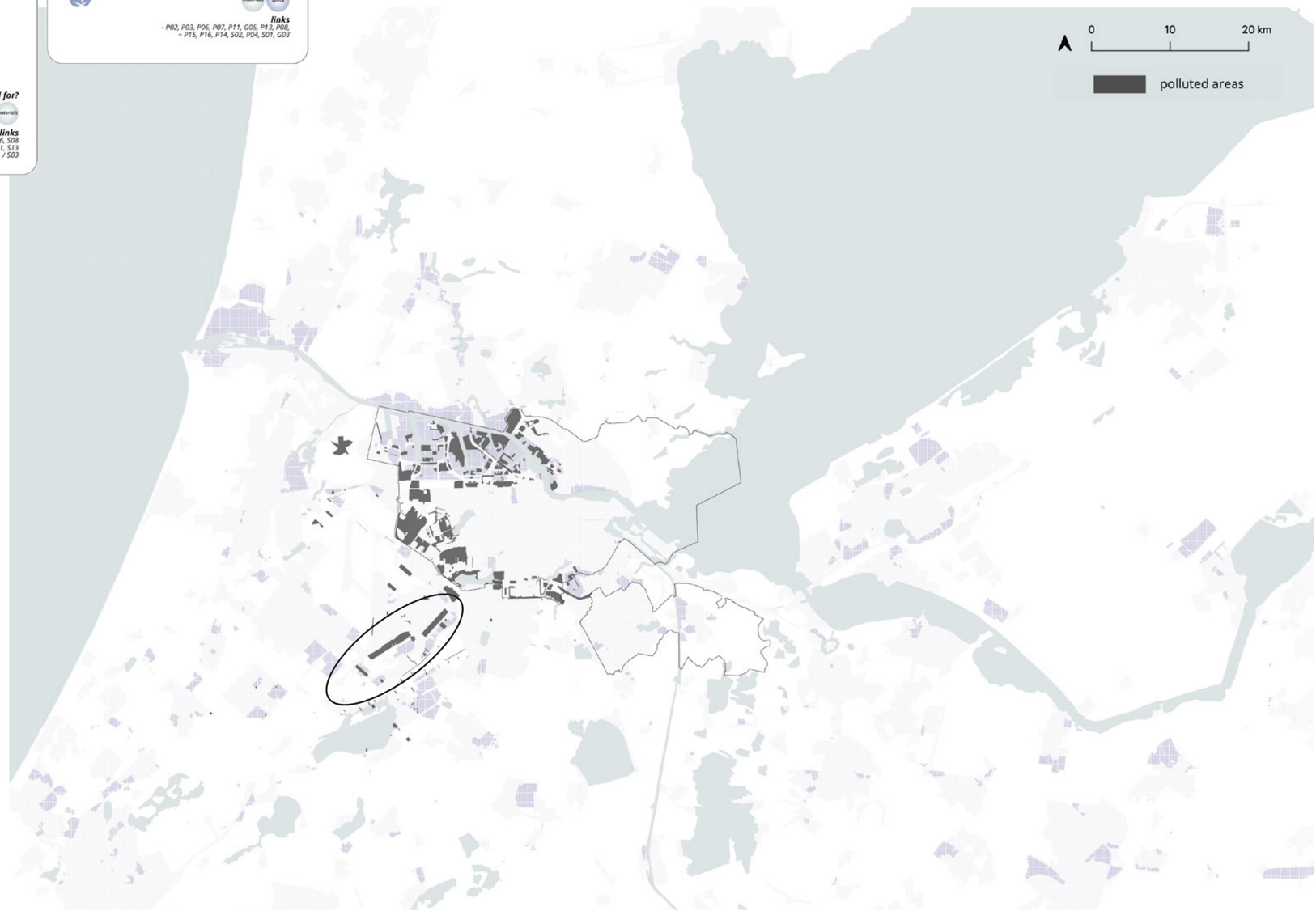


fig. 90 ***Polluted land in and around Amsterdam***
source // author, based on data from Furlan et al. (2019)



waste scapes
regional spatial potentials

There are still some unused spaces in the region with potential for implementing circular industrial activities. These include drosscapes alongside infrastructure and areas without a purpose, mostly in industrial zones, as well as areas affected by noise pollution from Schiphol's air traffic. The unused sites that lie in industrial areas could be activated through circular textile processing facilities. The ones outside of urban clusters could be utilised for textile crop cultivation.

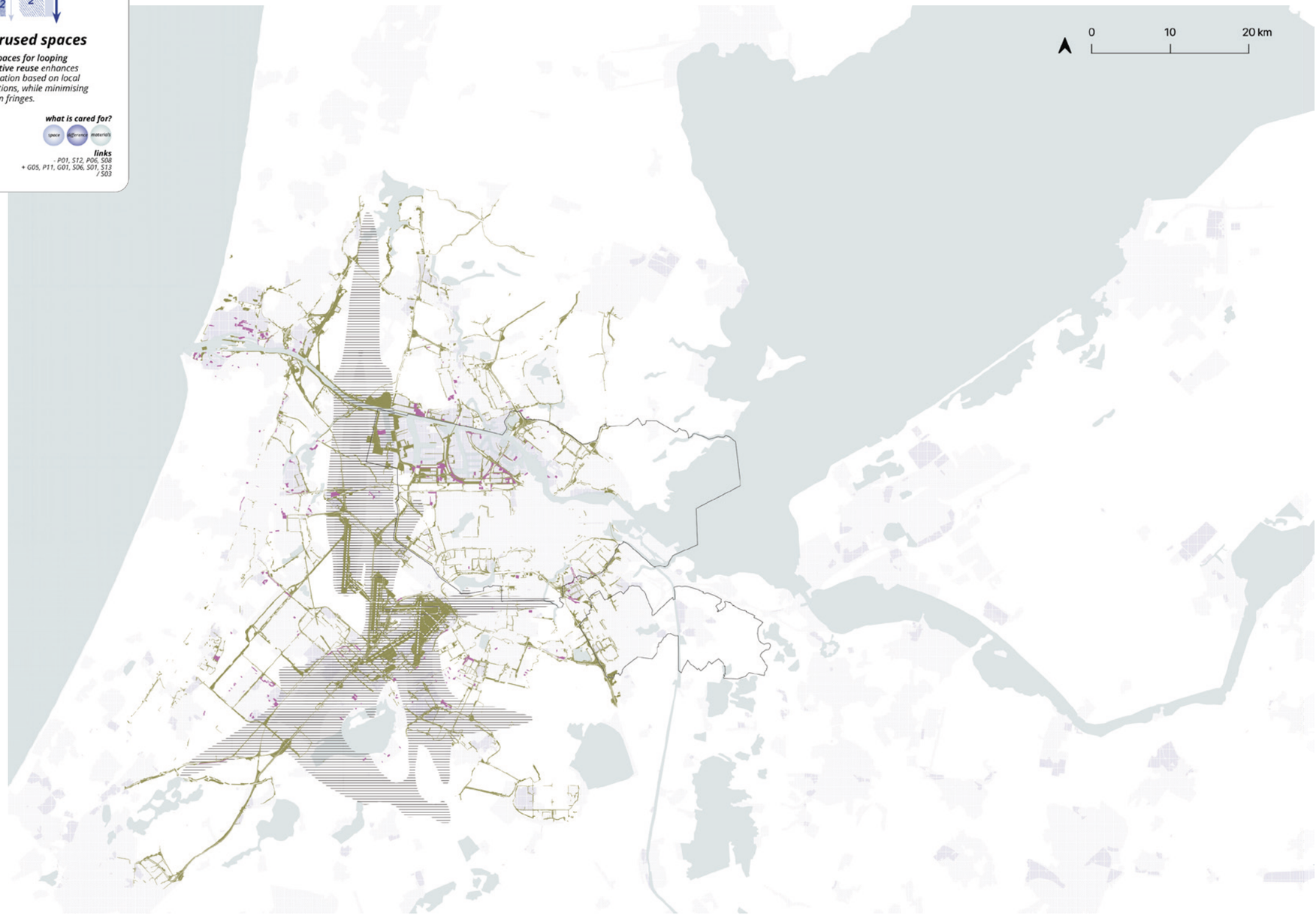
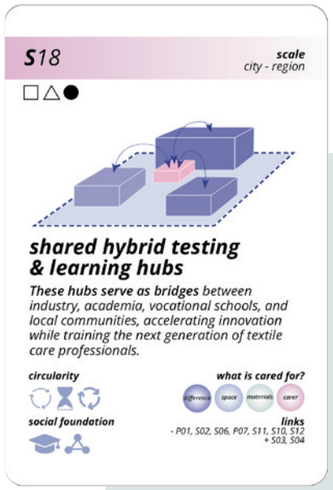


fig. 91 ***Wastescapes around Amsterdam***
source // author, based on data from Furlan et al. (2019)

innovation & education landscape
regional potentials

Innovation and educational facilities were mapped to identify strategic locations for synergy clusters with shared hybrid testing and learning hubs. Close collaboration with these institutions is essential for this. There are significant private and public initiatives in the region that aim to innovate textile circularity, and these initiatives should be supported and further connected. Furthermore, vocational education institutions could play a key role in educating skilled circular workers in the future.



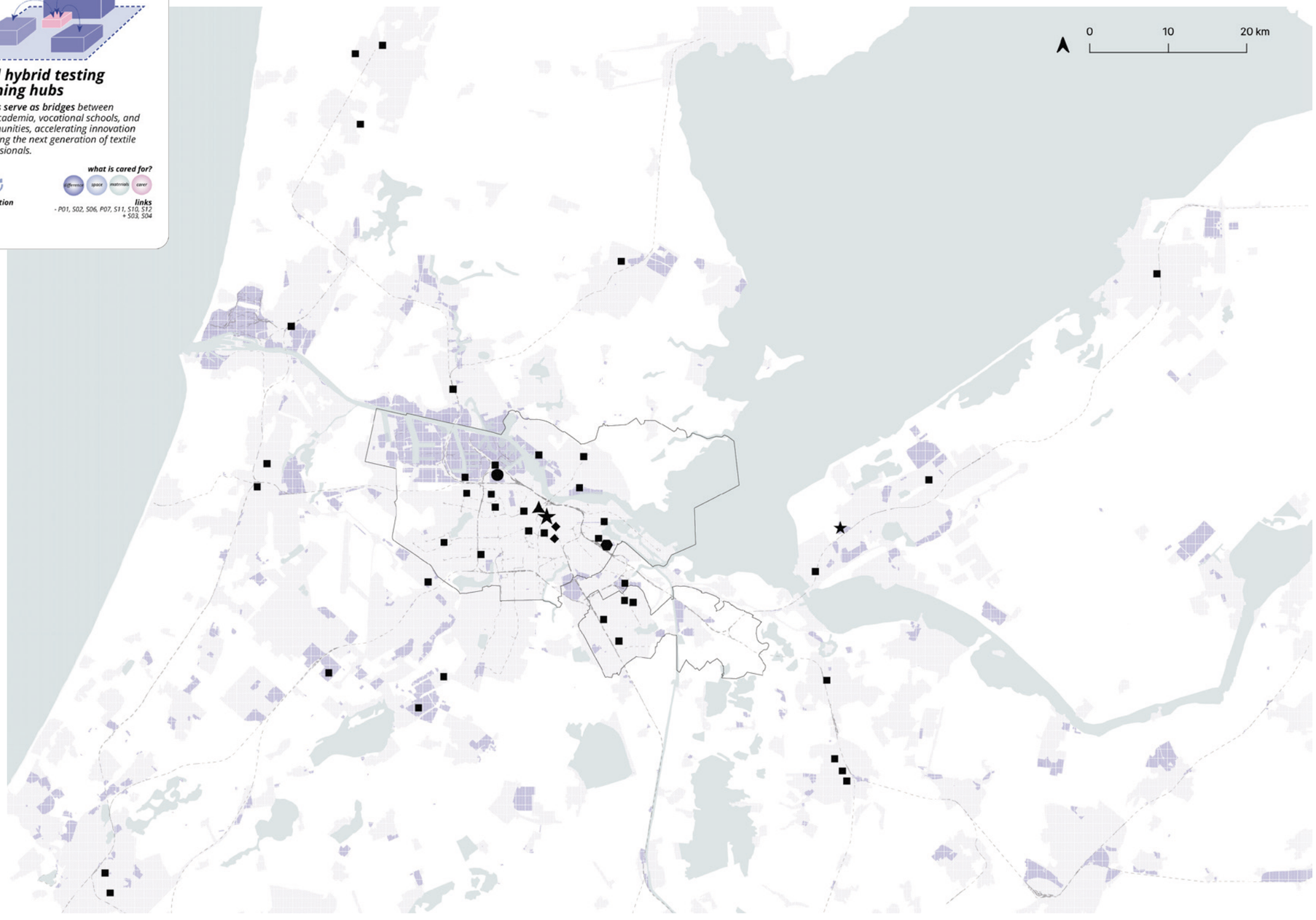
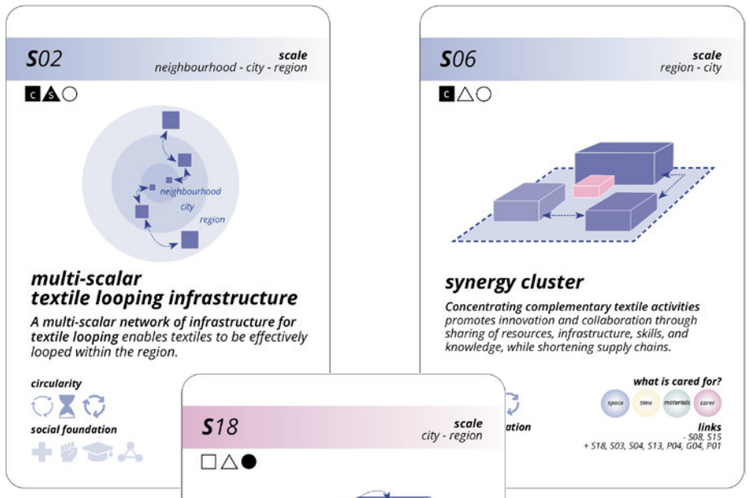


fig. 92 ***Innovation & education facilities***
source // author, based on OSM Foundation (n.d.)

regional spatial strategy
for a ‚care-full' circular textile system in the MRA

In order to establish a ‚care-full' circular textile value chain in the Amsterdam Metropolitan Region, it is essential to have spatially anchored clusters for textile processing. These clusters concentrate complementary activities, such as repair, design, recycling, production of bio-based fibers, and eco-finishing, in locations chosen for their proximity to zero-emission transport routes, including waterways and railways, as well as for their availability of underutilised space, as shown on previous pages. Concentrating key stages of textile processing within these clusters shortens supply chains and reduces transport-related emissions. Each cluster builds on existing initiatives and infrastructure while introducing new facilities that support the local looping of textiles and reduce dependency on global supply chains. By co-locating key stages of the textile value chain and integrating knowledge, logistics, and resource exchange, the clusters form the physical backbone of a just and regenerative regional textile system. The following page details the specific synergies between clusters and the facilities they host.



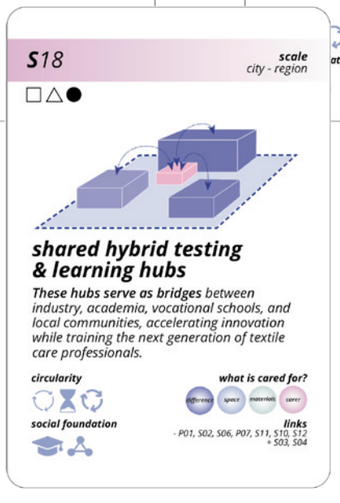
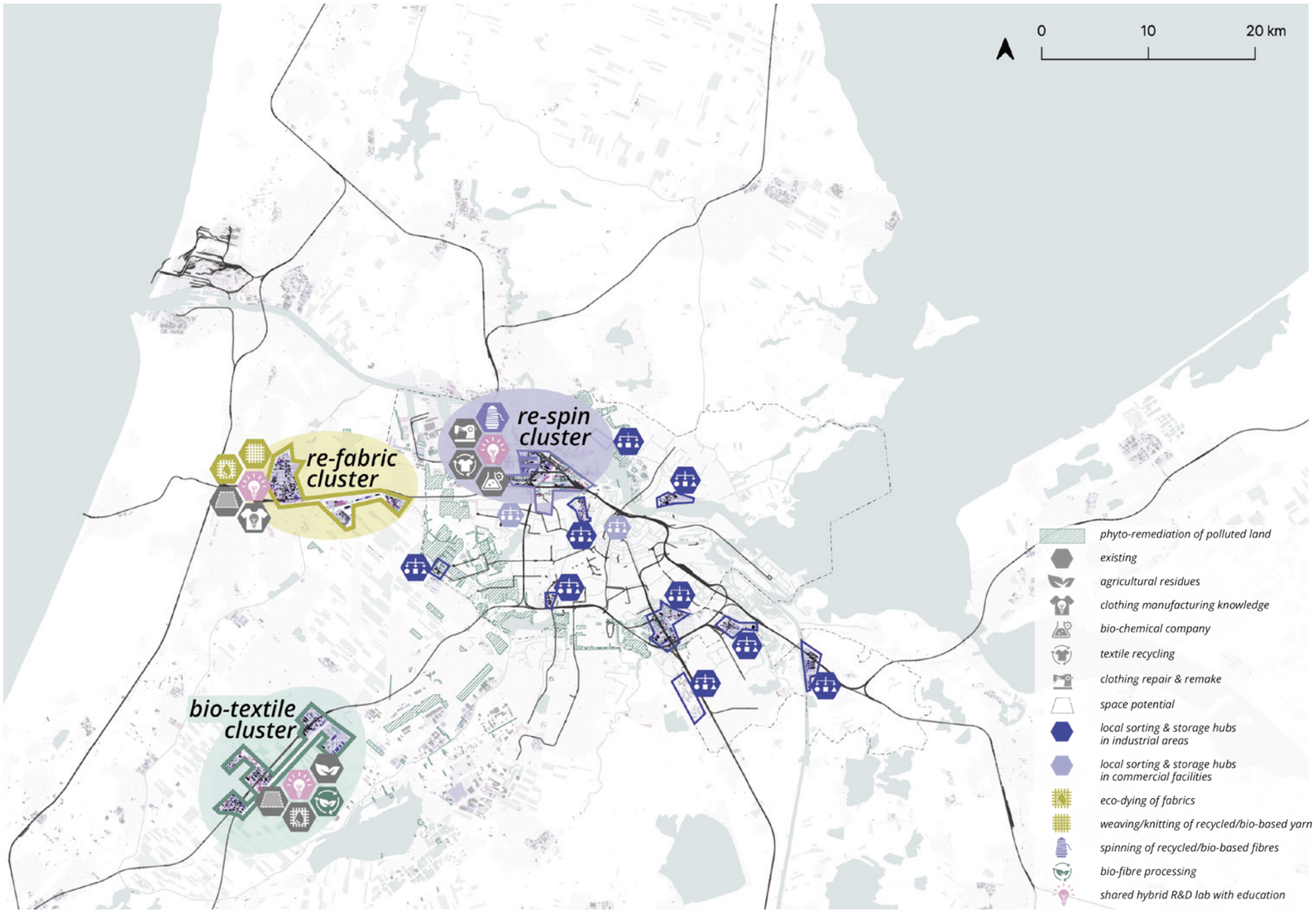


fig. 93 ***Regional spatial strategy***
source // author



time-space sensitive
regional spatial strategy

The maps (Fig. 94 and 95) demonstrate that the developed spatial strategy at the regional and city scales facilitates a short-distance textile loop network connected by zero-emission transport routes. The regional loop is accessible within 30 minutes via the existing freight train network, while the city loop is accessible within 15 minutes via cargo bikes.

fig. 94 ***15-min cargo-bike accessibility of the sorting & storage hubs***
source // author

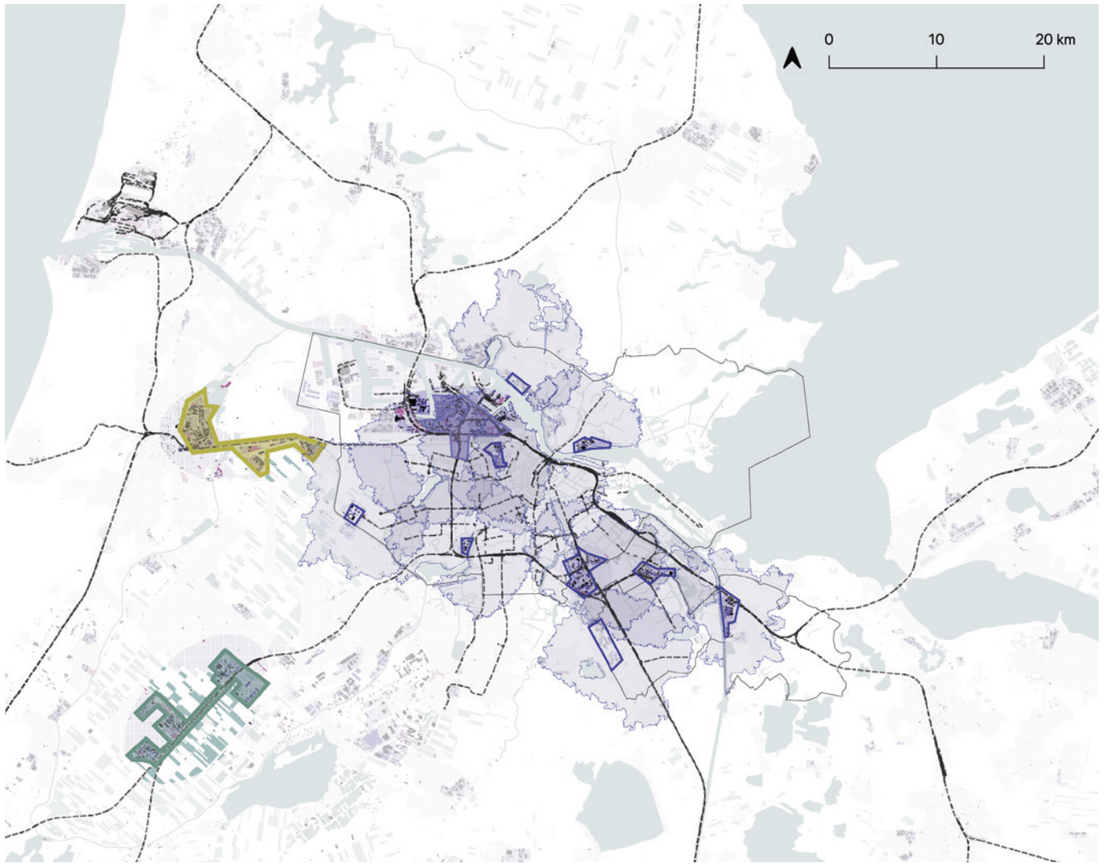
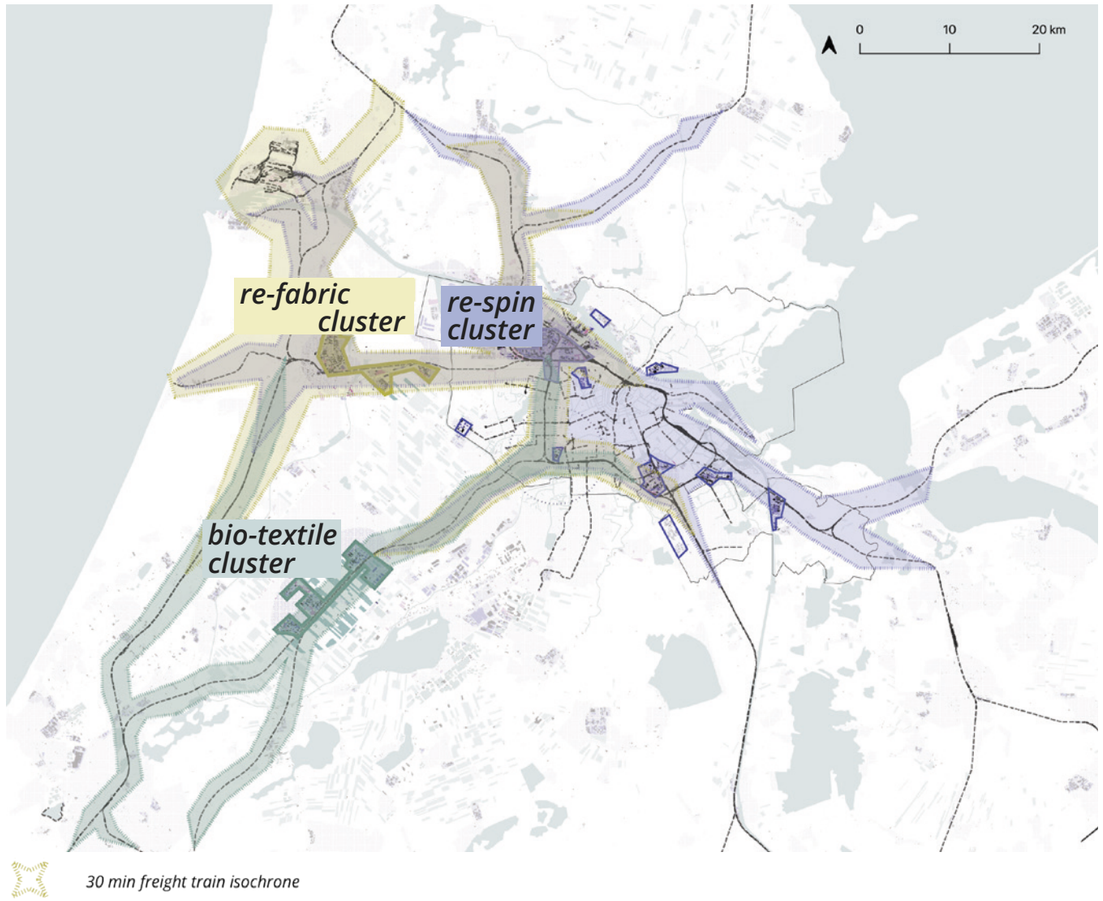
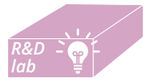


fig. 95 ***30-min freight train accessibility of the clusters (based on EU average speed of 30km/h)***
source // author



the ‚care-full' synergy clusters
explained



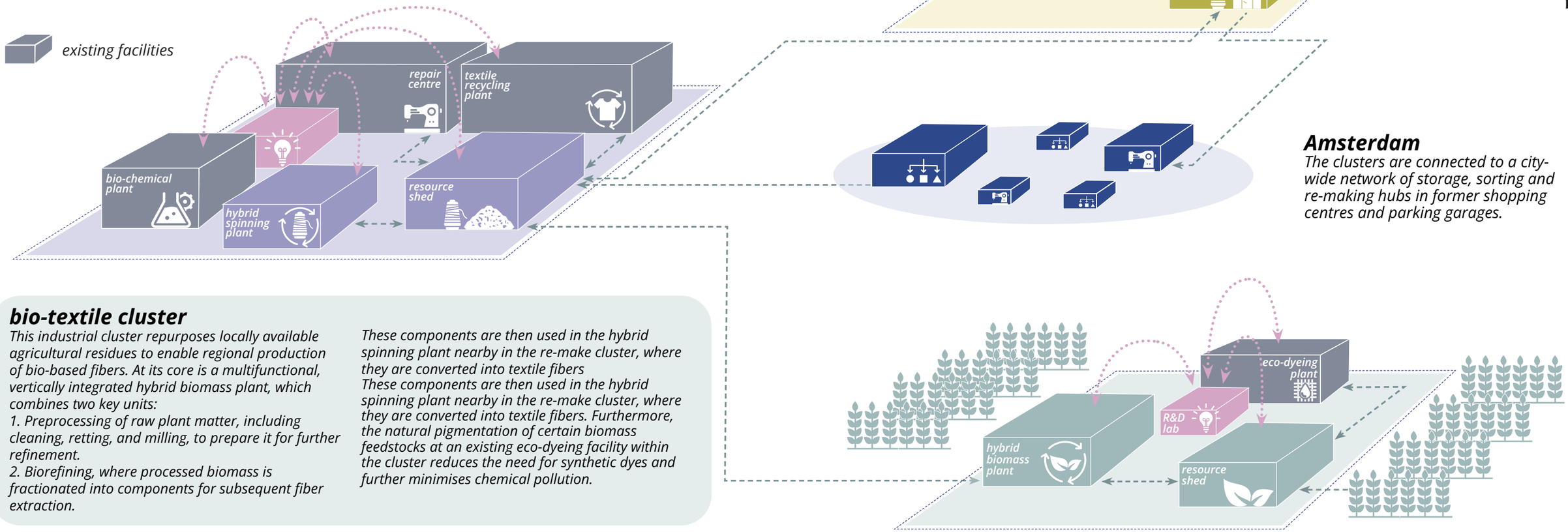
The ***shared hybrid testing & learning hubs*** are multi-functional hubs integrated into each regional textile cluster that combines applied research on circular textile innovation, small-scale prototyping and piloting, educational and vocational training spaces, and cross-sector collaboration platforms (e.g., design, agriculture, chemistry, logistics)? These hubs serve as bridges between industry, academia, vocational schools, and local communities, accelerating innovation while training the next generation of textile care professionals. They are co-managed by public institutions, industry consortia, and educational bodies and are accessible to SMEs and cooperatives via subsidised lab time or innovation vouchers. Additionally, they offer open lab days, residencies, and public showcases to connect with the community. The hubs offer dual education (work-study tracks) for young professionals and lifelong learning modules for upskilling the existing workforce.

re-spin cluster

The industrial synergies within this cluster focus on re-making clothing. Textiles collected from surrounding urban areas are sorted and then either repaired or upcycled. At the same time, non-repairable garments are mechanically or chemically recycled, with the resulting fibers extruded and spun into new yarns at a hybrid spinning facility. This plant also processes regional bio-based fibers sourced from the nearby bio-textile cluster. A shared resource shed within the cluster enables efficient material exchange, decentralised sorting, and flexible storage, optimizing the flow of materials across production stages. An existing bio-chemical plant, in collaboration with the University of Amsterdam, is already piloting innovative chemical textile recycling technologies. Cross-sectoral innovation is further facilitated through a hybrid R&D lab, which supports shared experimentation and knowledge transfer among academia, textile recyclers, and spinning companies to enhance recycling processes.

re-fabric cluster

The re-fabric cluster unites a network of textile design studios, an eco-dyeing facility, and integrated weaving and knitting plants. It complements the other clusters by focusing on fabric production and finishing stages in the supply chain. Spun fibers from the Re-Spin Cluster are woven or knitted into fabrics, which are then dyed using ecological methods by an expanded dyeing unit linked to the Bio-Textile Cluster. The finished fabrics are distributed to local re-making hubs to promote manufacturing in the city and raise awareness about the manual labor involved in producing clothing. This approach also promotes local employment and reduces the distance between work and home.



bio-textile cluster

This industrial cluster repurposes locally available agricultural residues to enable regional production of bio-based fibers. At its core is a multifunctional, vertically integrated hybrid biomass plant, which combines two key units:
1. Preprocessing of raw plant matter, including cleaning, retting, and milling, to prepare it for further refinement.
2. Biorefining, where processed biomass is fractionated into components for subsequent fiber extraction.

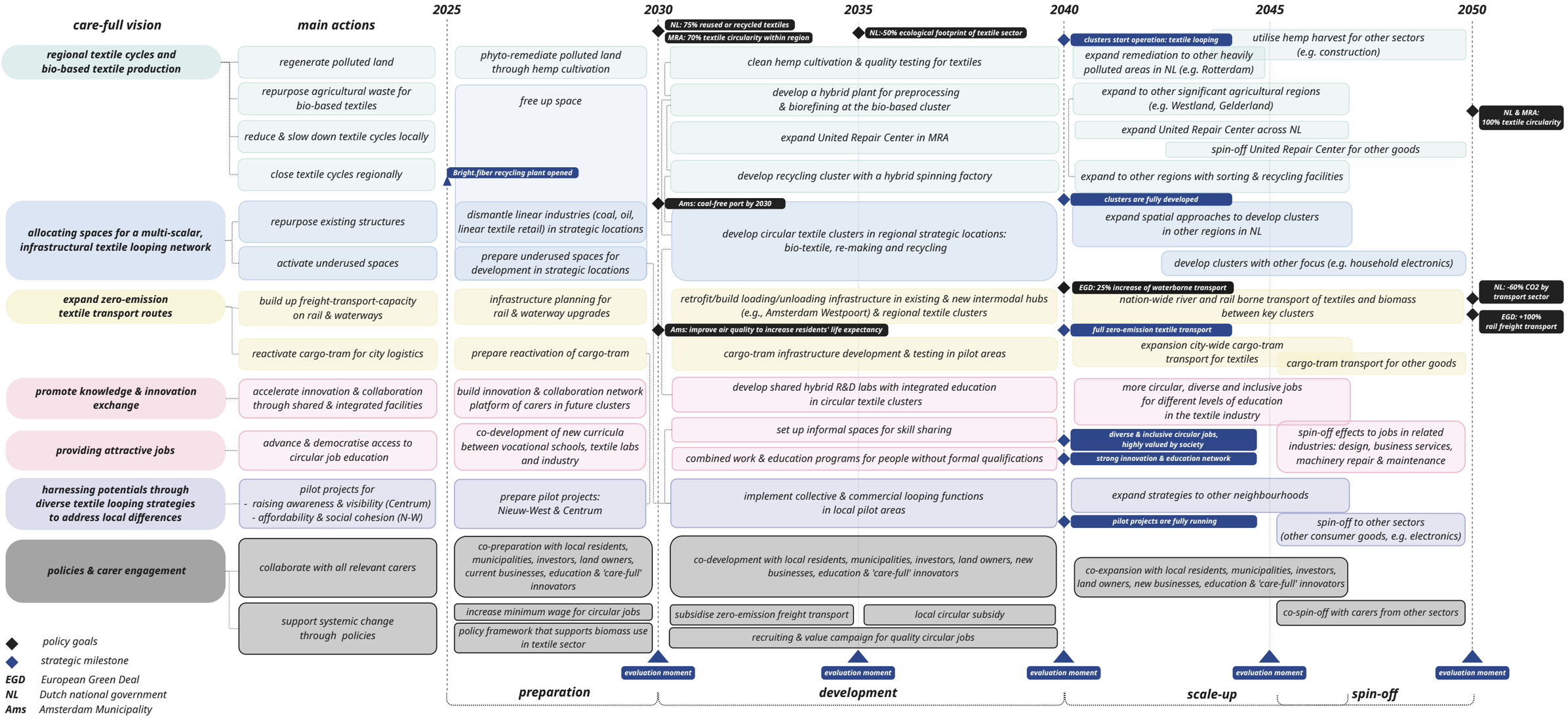
These components are then used in the hybrid spinning plant nearby in the re-make cluster, where they are converted into textile fibers
These components are then used in the hybrid spinning plant nearby in the re-make cluster, where they are converted into textile fibers. Furthermore, the natural pigmentation of certain biomass feedstocks at an existing eco-dyeing facility within the cluster reduces the need for synthetic dyes and further minimises chemical pollution.

fig. 96 ***Diagram of the synergy clusters***
source // author

phasing
a ‚care-full' textile transition

The timeline on this page provides a structured roadmap for realising a 'care-full' circular textile system, outlining policy goals and phased implementation. Visual bars illustrate how the six vision aspects - caring for materials, space, time, carers, and differences - are translated into main actions, each supported by targeted policies and inclusive engagement of carers. It is important to note that the expansion and spin-off phase may overlap with the development phase, reflecting the dynamic and iterative nature of the transition.

fig. 97 ***Strategic phasing overview***
source // author



carer engagement strategy
for a ‚care-full' textile transition

The relevant carers that need to be involved in this 'care-full' transition process can be categorised into three groups:
1. the care takers: the individuals, communities and organisations that take active action and care to drive the ‚care-full' circular transition. These groups need to be valued and supported in their care work.
2. the non-carers: consists of businesses that still follow a linear and profit-oriented approach and traditional consumers that don't care or know about the impacts of their consumption choices.

These groups need to be nudged to change their business-as-usual ways.
3. the care givers: mostly public institutions that are able to give or distribute power and incentives among stakeholders and therefore, to steer transformation in desirable directions. These need to be informed about potentials for improving policies and strategies (policy recommendations at the end of this thesis)

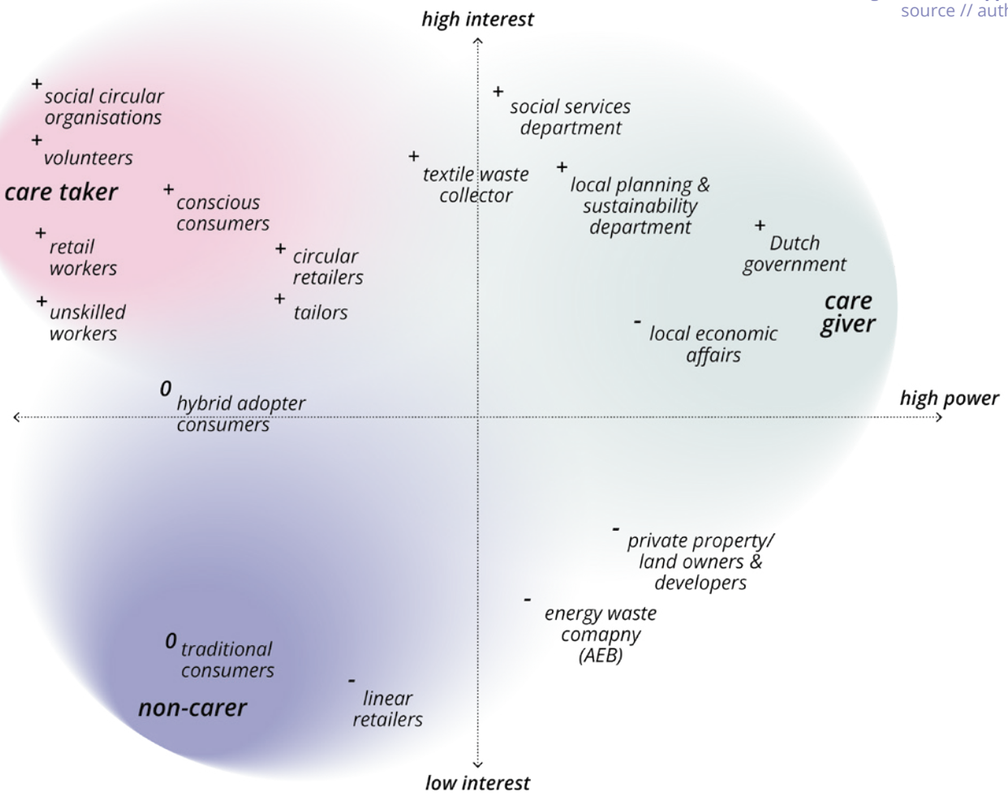
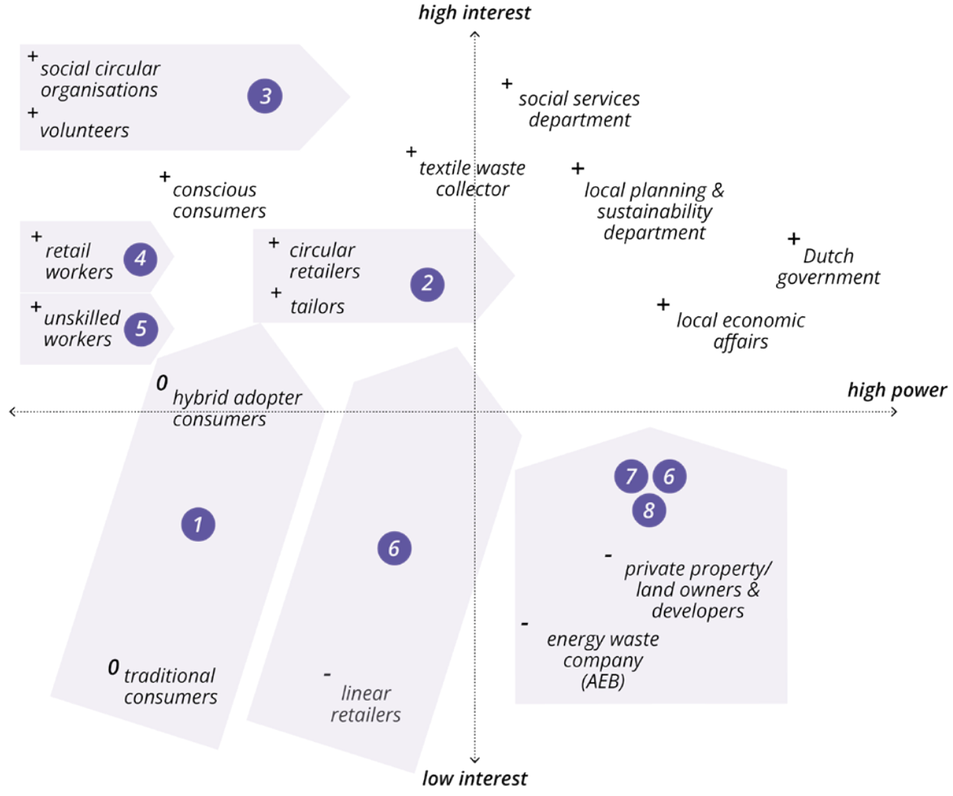


fig. 98 ***carer mapping***
source // author

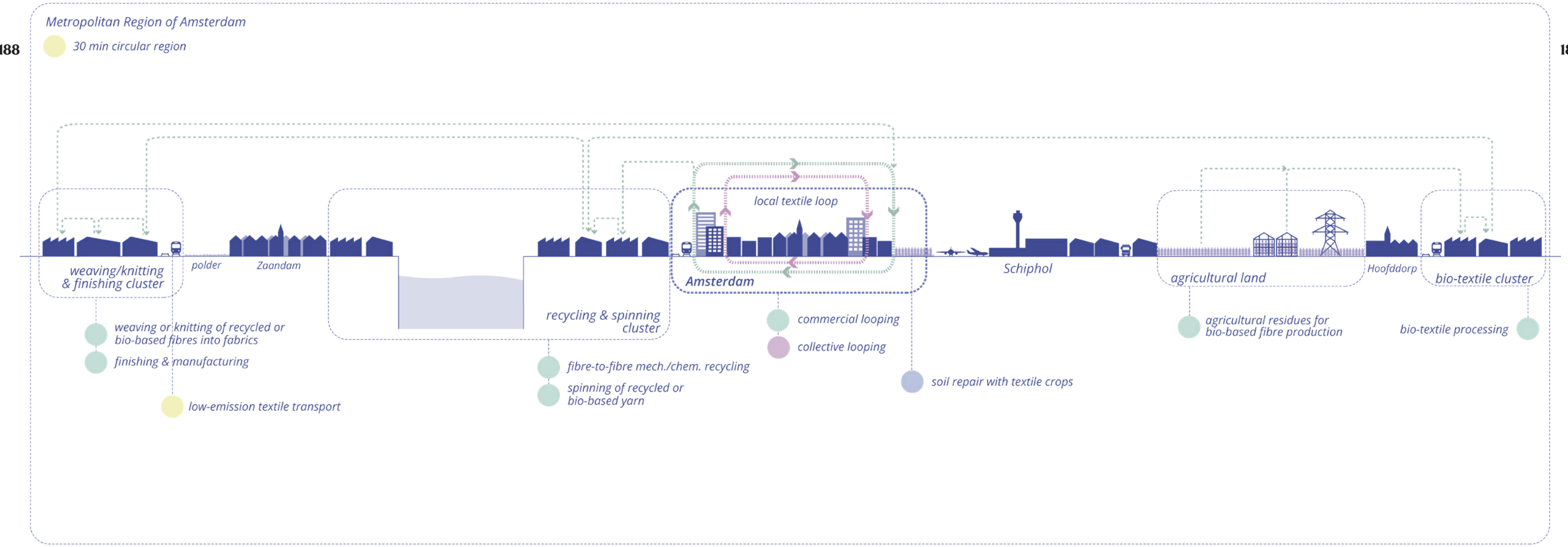
fig. 99 ***carer engagement strategies***
source // author



a ‚care-full' circular textile system in the MRA
regional strategy

The regional spatial strategy allows for closing the textile loop regionally by recycling surplus, not reusable clothes from the city loop and feeding recycled and bio-based clothes back into the local loop again. The next section demonstrates the spatial strategy for the local ‚care-full' textile loop in the city of Amsterdam.

fig. 100 ***Systemic section of the regional strategy***
source // author



Amsterdam's ‚care-full' loop
spatial analysis

For designing the local textile loop in Amsterdam the ‚care-full' strategies need to address varying building densities and land values across the city. Small clusters of retail and industrial throughout the city pose potential for commercial textile processing.

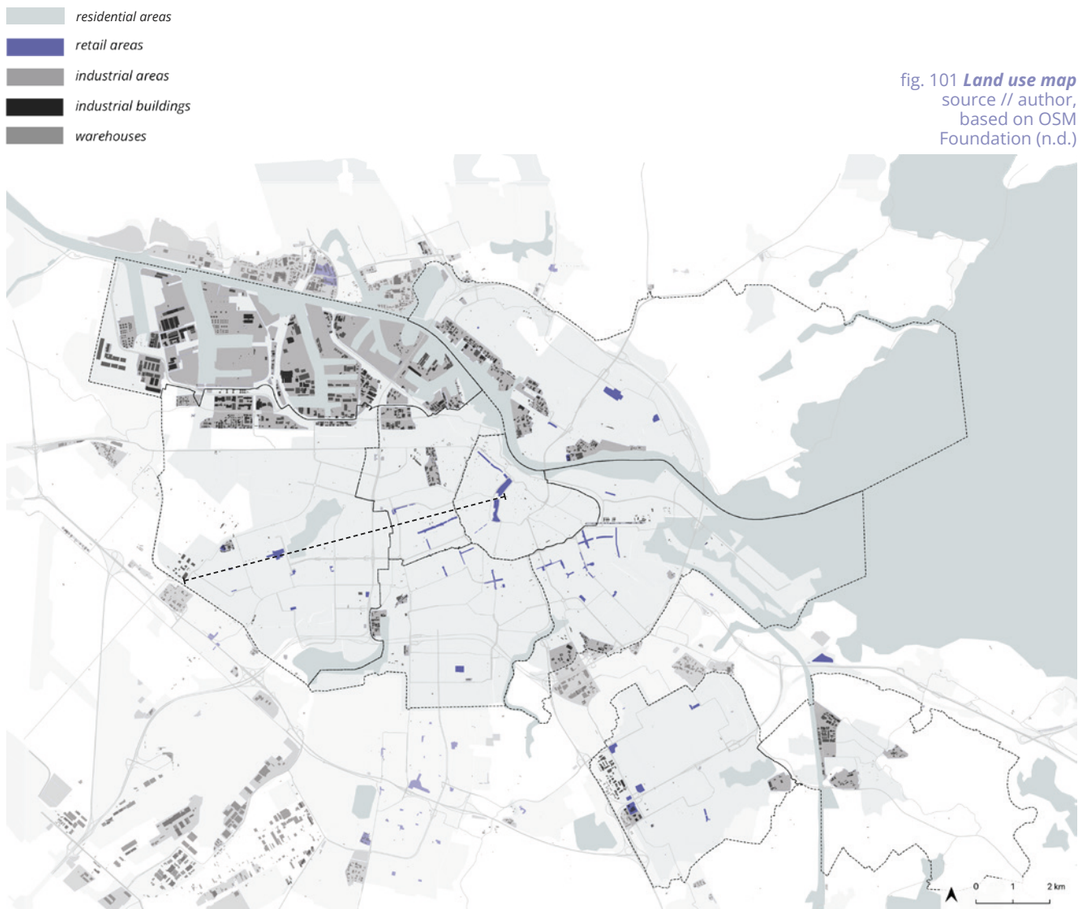


fig. 101 ***Land use map***
source // author, based on OSM Foundation (n.d.)

fig. 102 ***Building density map***
source // author, data from PBL (2024)

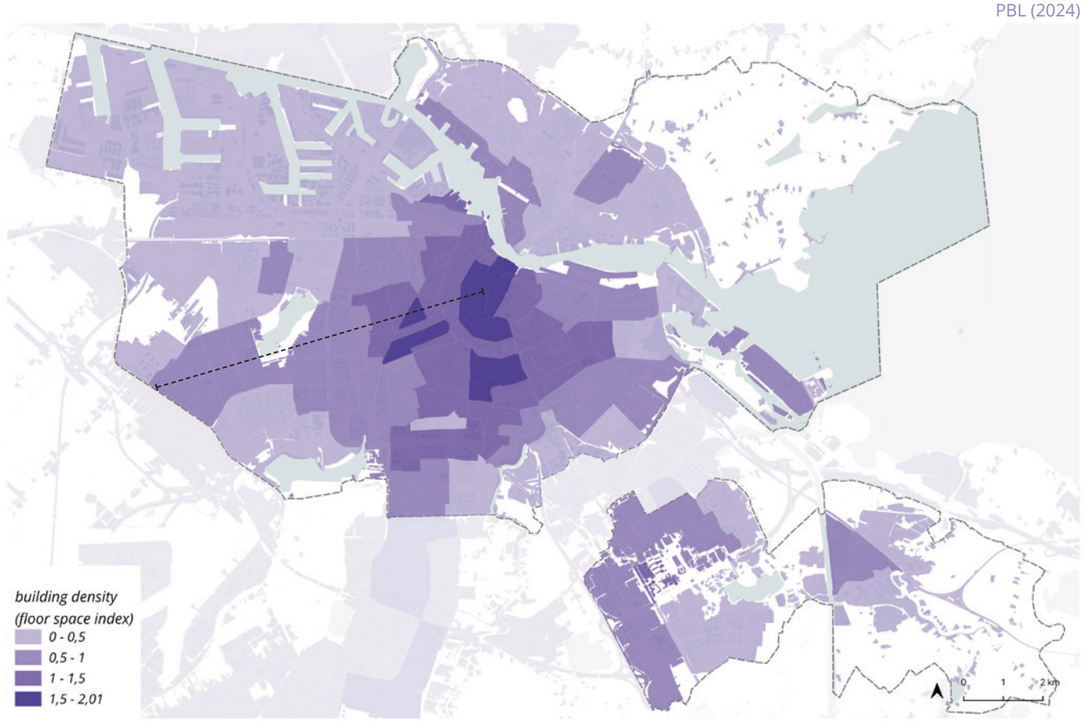
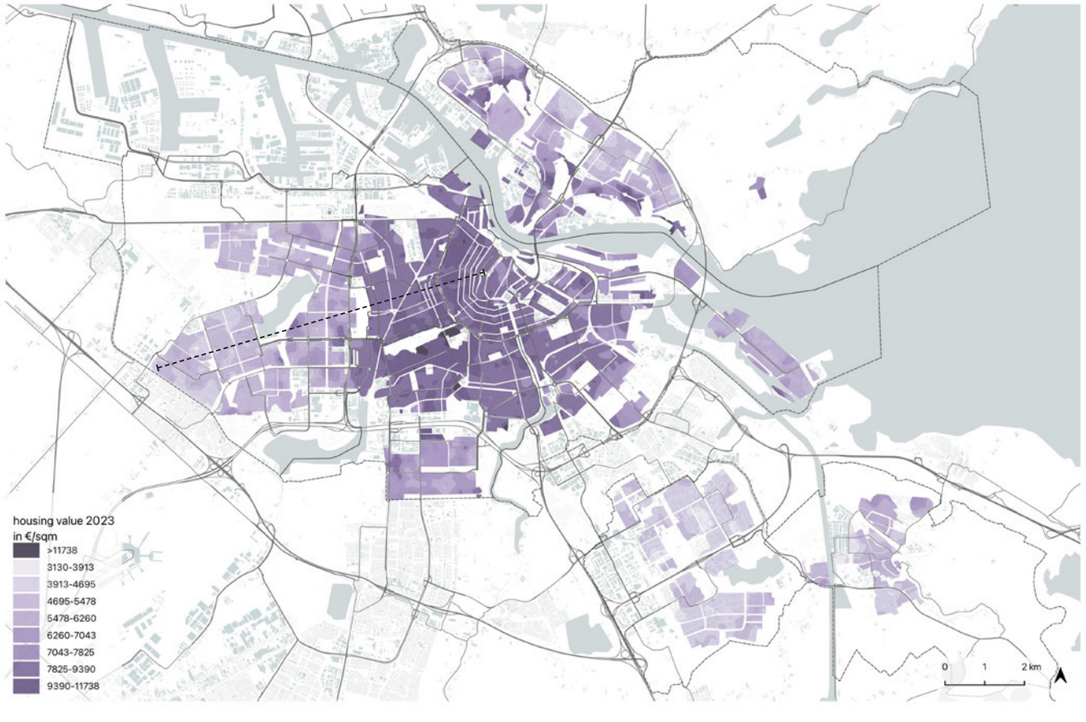


fig. 103 ***Housing value map***
source // author, data from Amsterdam Municipality (n.d.)



Amsterdam's ‚care-full' loop
pattern implementation strategy

The diagram shows the pattern implementation strategy to address different spatial conditions and challenges in implementing circular textile systems include:

mix of commercial and collective looping
Combining commercial textile activities such as retail or repair services with collective, community-driven looping like sharing events and remaking workshops to maximise reach and participation across diverse user groups.

high-density mixed areas
Repurposing existing structures by co-locating textile looping activities - such as repair services - with other urban functions (shops, libraries, or community centers). This approach leverages limited space and increases visibility and accessibility in areas with high population density.

low-density residential areas
Activating underused spaces, such as courtyards or vacant buildings, for collective looping initiatives. This makes circular textile practices accessible to residents where dedicated commercial infrastructure may be lacking, fostering community cohesion and engagement.

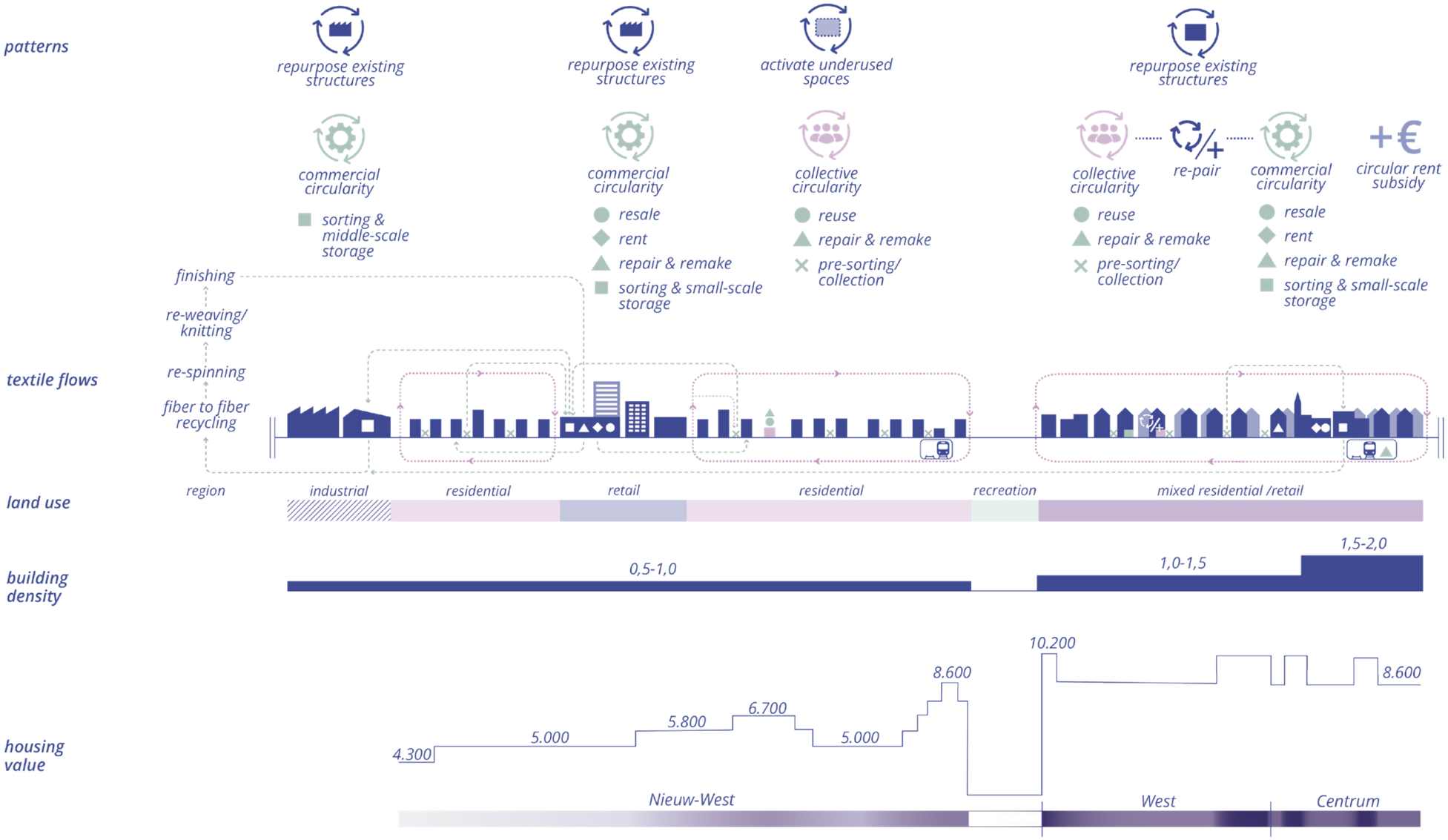


fig. 104 ***Systemic section of a part of Amsterdam with pattern strategy***
source // author

Amsterdam's ‚care-full' loop
spatial strategy

The local loop in Amsterdam can be achieved through firstly, repurposing existing warehouses and linear industrial and commercial buildings throughout the city into a sorting & storage network covering the whole city within 15-min cargo-bike radius (fig. 105) to collect surplus clothes from the neighbourhoods. The strategy envisions to activate underused spaces, such as courtyards for collective looping in low-density residential neighbourhoods and repurposing existing structures by co-locating (re-pair) textile looping activities with other functions in the mixed higher-density center of the city. For example, in busy metro stations drop & collect stations can collect clothing for repair to send to home tailors around to offer conveniently accessible repair services on the way to work.

fig. 105 ***15-min cargo-bike accessibility of sorting & storage hubs***
source // author

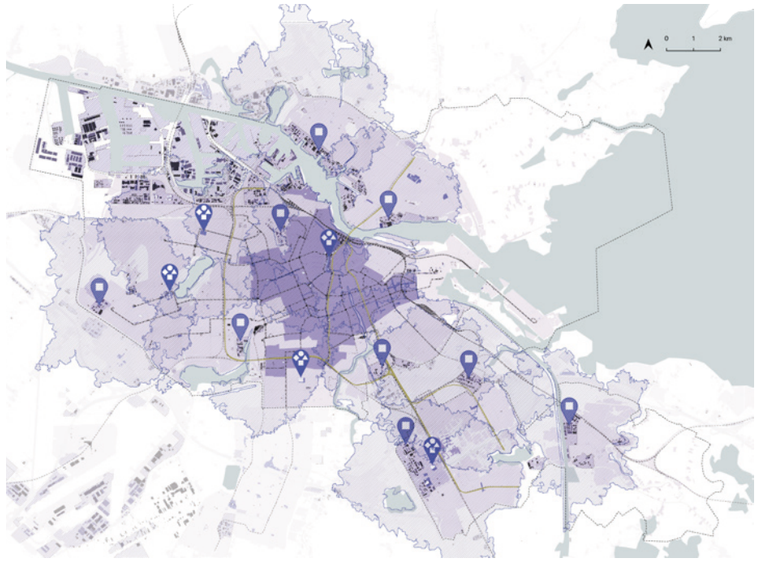
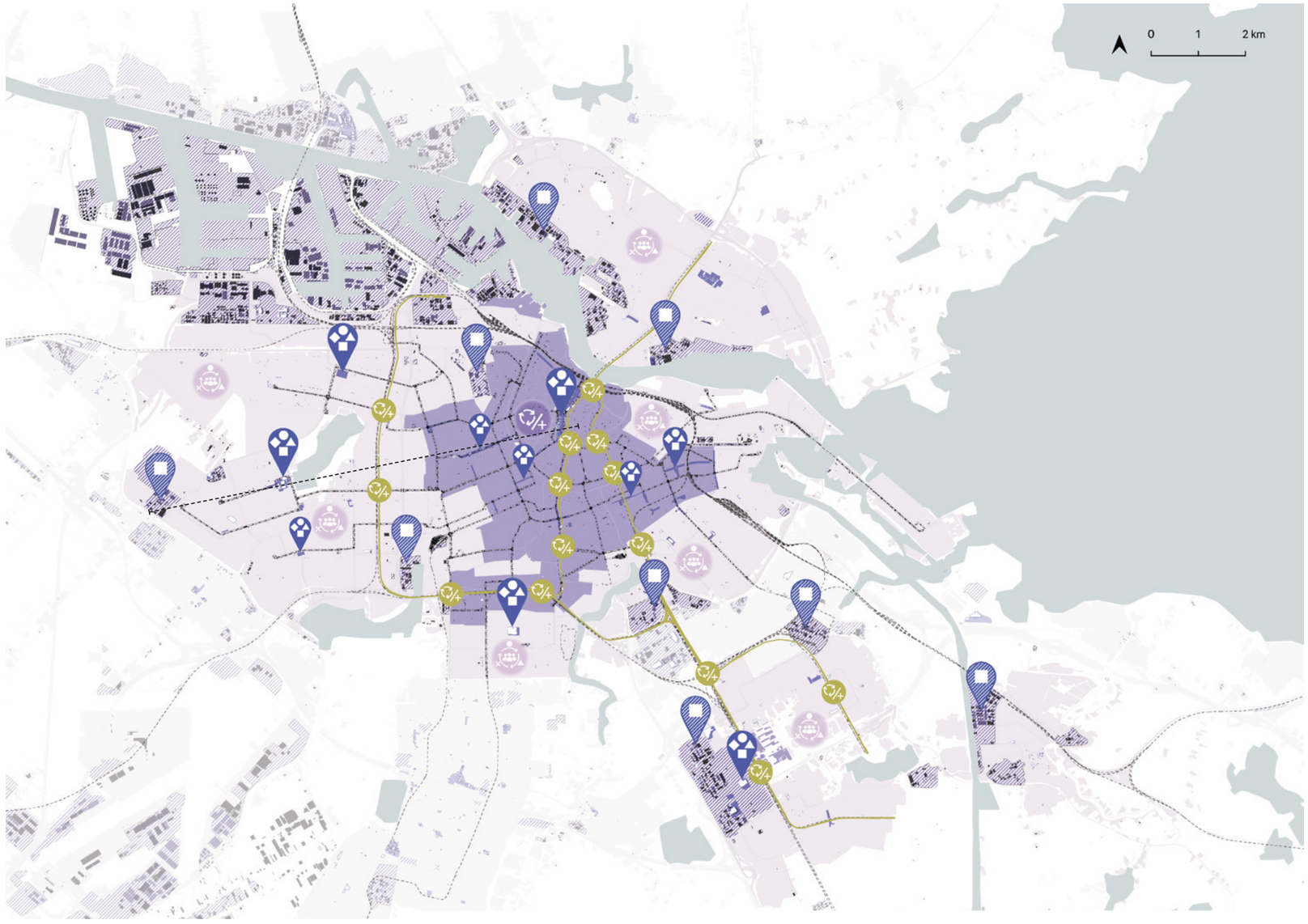


fig. 106 ***spatial strategy of the local loop***
source // author



collective looping (5min walking radius) in low-density neighbourhoods

re-pair in commercial or comunal buildings higher-density neighbourhoods

sorting & middle-scale storage in industrial & commercial areas

sorting & small-scale storage in retail areas

warehouses and industrial buildings

metro line

re-pair in busiest metro stations (drop & collect repair service)

15min cargo-bike isochrone

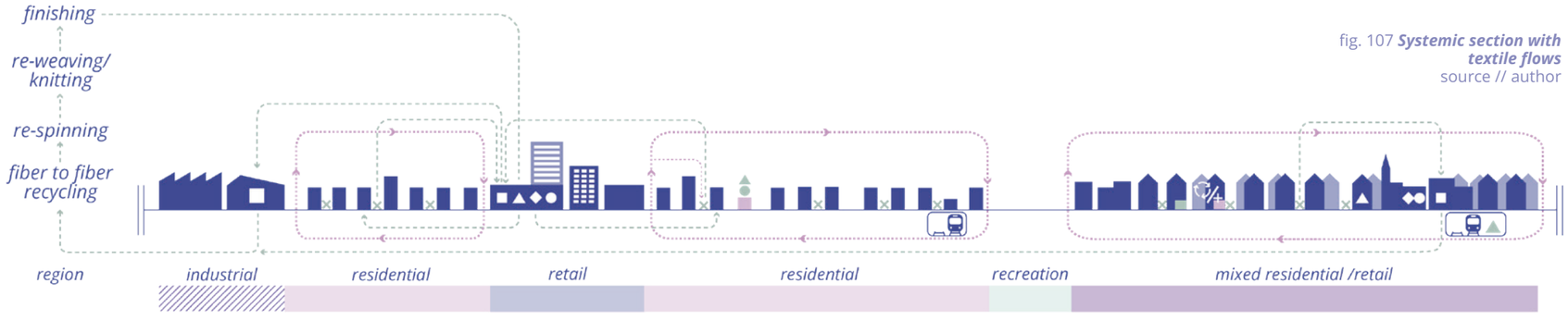


fig. 107 ***Systemic section with textile flows***
source // author

pilot project a
Amsterdam Nieuw-West - Osdorp neighbourhood

This section illustrates how the local loop strategy can be applied within low-density urban areas that are home to vulnerable populations and currently lack adequate access to circular textile infrastructure. It demonstrates the integration of collective looping facilities at the 5-minute neighbourhood scale and commercial looping functions at the 15-minute scale, tailored to the spatial and social context of these under-served communities.

fig. 108 ***spatial strategy of the local loop***
source // author

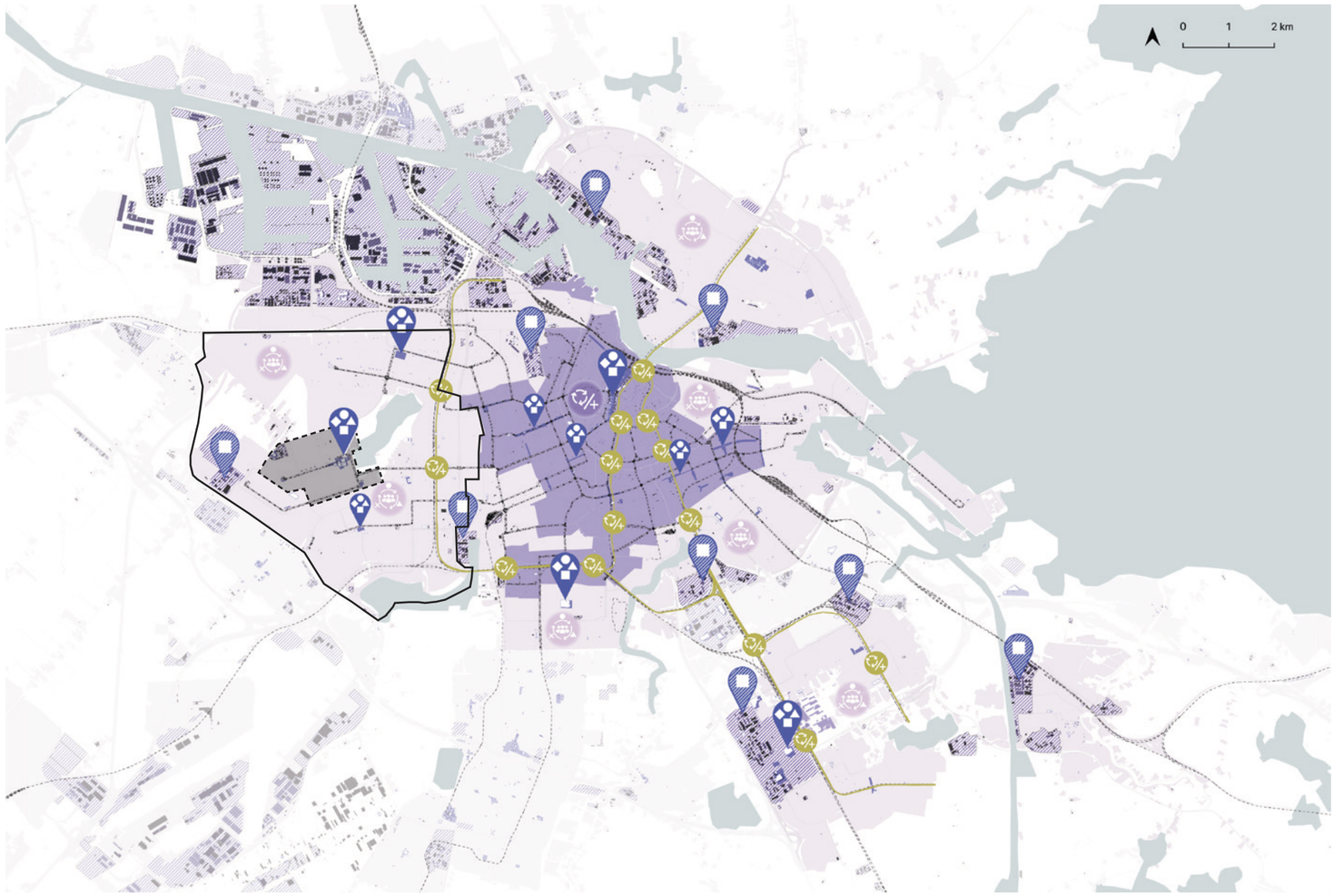
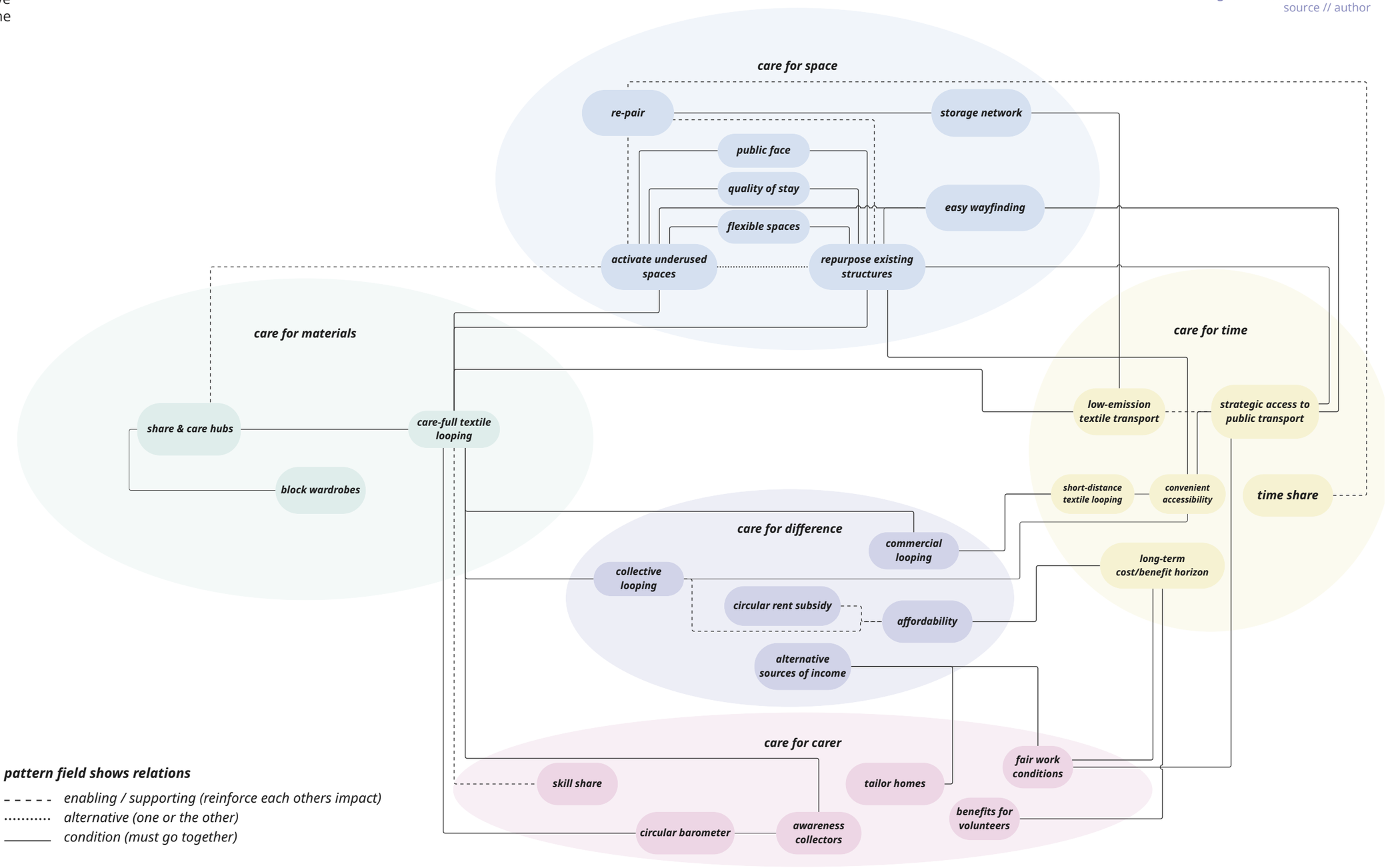


fig. 109 ***Systemic section with textile flows***
source // author

patterns for a ‚care-full' textile ecosystem
at the city & neighbourhood scale

The pattern field, which shows the different links between the patterns at city, neighbourhood and block scales, was generated before and adapted throughout the design phase. The links have different values, as shown in the legend.

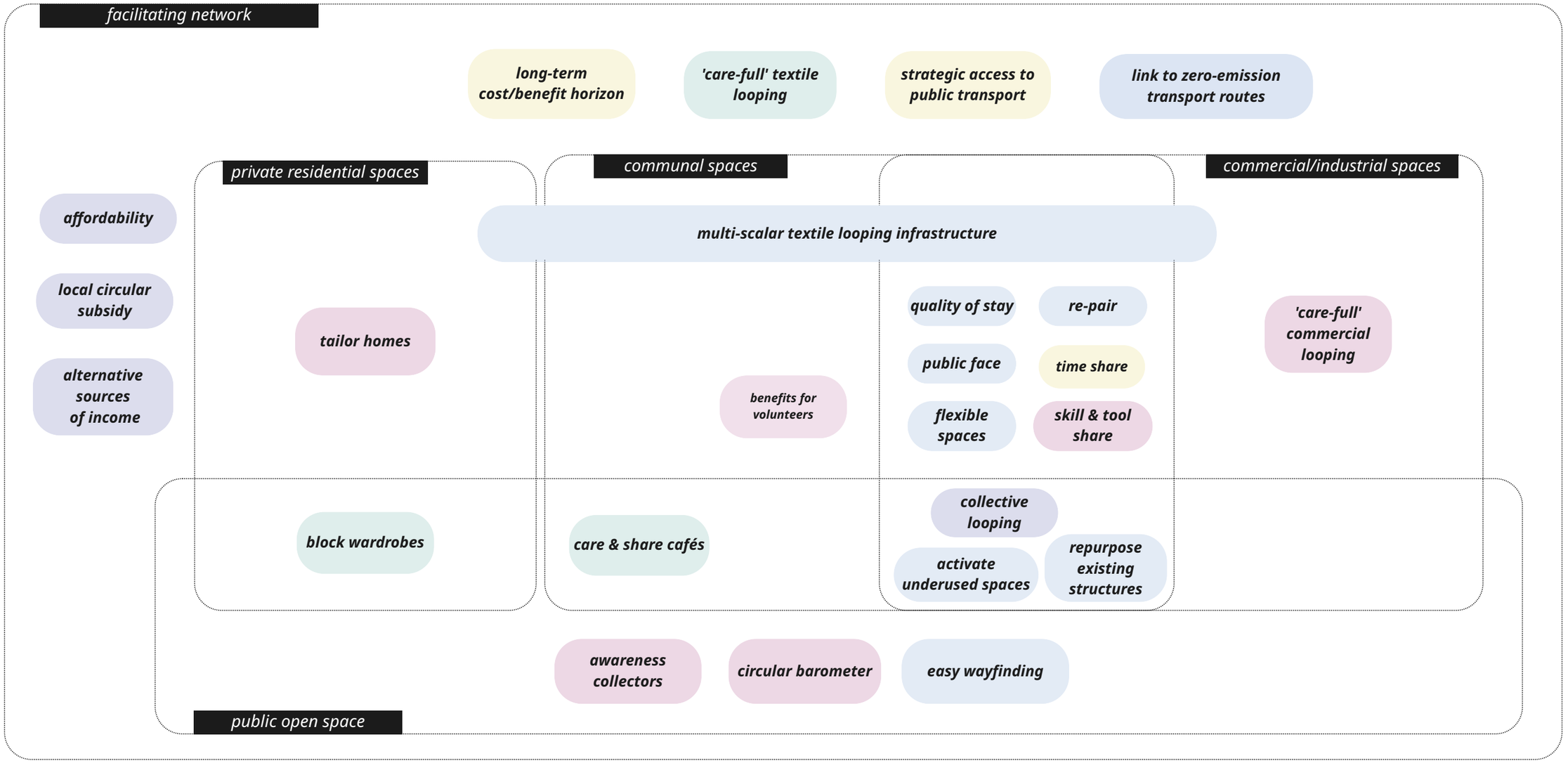
fig. 110 ***Pattern field for city, neighbourhood and block scale***
source // author



pattern field
for designing at city/neighbourhood scale

This pattern field shows patterns for the city and neighbourhood scales, distributed across the different spatial types identified in the city, to inform the design. The next step involved exploring the potential for implementing the respective patterns before concluding the local spatial strategy.

fig. 111 ***Pattern field showing spatial distribution of patterns***
source // author



‚care-full' circular pattern language VI

pilot project a
Amsterdam Nieuw-West / Osdorp neighbourhood

In order to examine the socio-ecological and spatial potentials of the ‚care-full' circular approach, a district with a widely vulnerable population was chosen for further analysis. Nieuw-West is a district of Amsterdam where a big share of households experience different struggles simultaneously, such as low socio-economic score, severe loneliness and low social cohesion. An additional aspect that leads me to investigate this areas of the city is the highly limited access to circular textile options, which was a result from the time/space analysis on page 85. Lastly, the neighbourhoods of Osdorp are urban renewal projects planned by the municipality. Therefore, I would like to propose actions to renew more ‚care-fully' to enhance circularity.

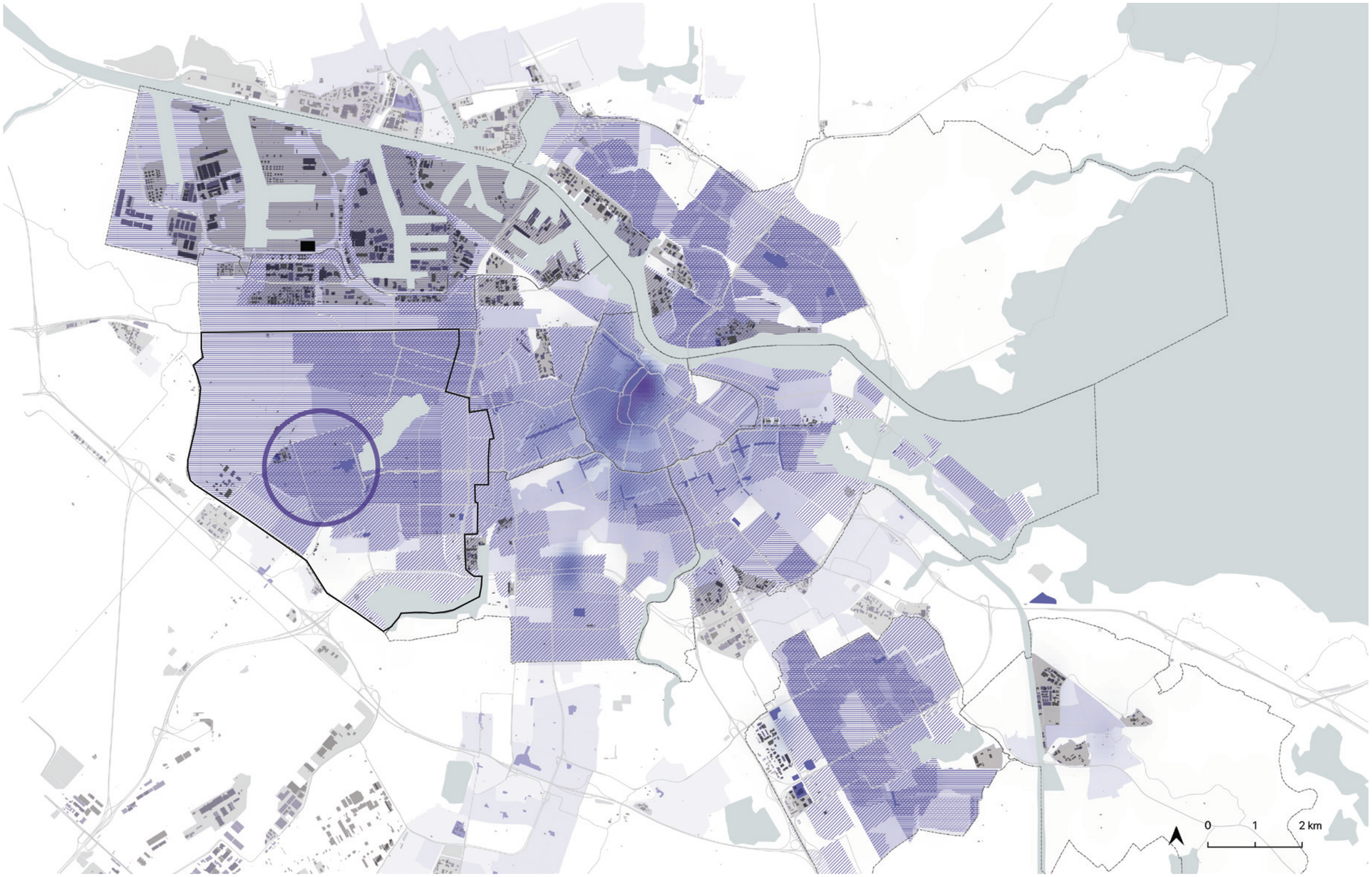


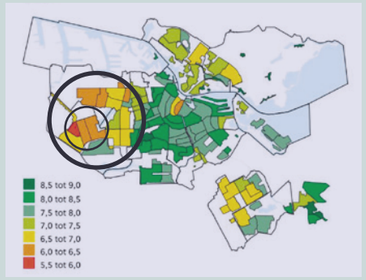
fig. 112 ***Conclusion map of challenges in Amsterdam***
source // author

care for difference
socio-ecological profile of Amsterdam Nieuw-West

The socio-ecological profile of the district also shows that more individuals are less educated, have lower income, have migration background and have more children than the Amsterdam average (Municipality of Amsterdam, 2024). The housing survey shows that the residents, especially in the neighbourhoods of Osdorp Oost, Midden and De Punt are generally more dissatisfied with different factors than in other neighbourhoods as shown in the maps fig. 113 (Municipality of Amsterdam, 2024).

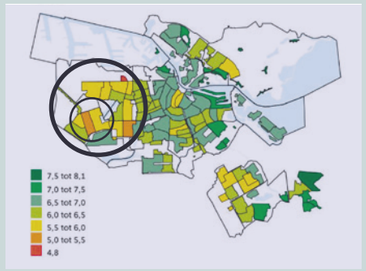
fig. 113 ***Maps of housing survey***
source // Municipality of Amsterdam (2024)

very dissatisfied
with own neighbourhood



very unpleasant
contact with other people

no or low involvement
of local residents



never or very little
helping each other

165.000 *inhabitants in 2023*
18% *growth until 2050*

highest percentage of population ***< 18***
highest percentage of middle-aged between ***35-65 years***

49 % *single-person households*
Amsterdam average = 54%
21 % *couple with children*
Amsterdam average = 15%

65% *of inhabitants have basic qualification*
Amsterdam average = 71%
37% *with vocational education degree*
Amsterdam average = 30%
32% *of the population aged 15 to 74 has higher vocational education or university degree*
Amsterdam average = 48%

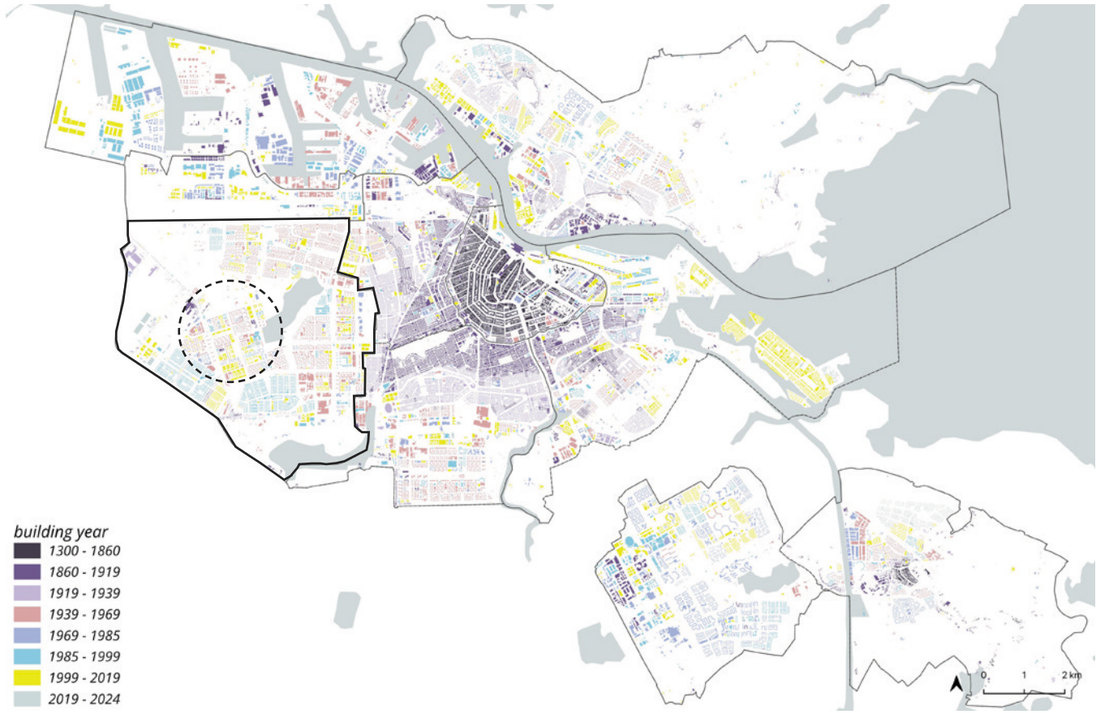
42.300€*/year (=lower average) mean disposable income per household*
Amsterdam average = 48.700€/year
21% *low income households*
Amsterdam average = 20%
39% *of population >18 has difficulty to make ends meet*
Amsterdam average = 36%
12% *of long-term minimum income*
Amsterdam average = 10%

70% *migration background*
Amsterdam average = 60%
20% *Moroccan*
12% *Turkish*
5% *Surinamese*
10% *other Asian countries*

care for space?
housing value, building age and building density

Osdorp Nieuw-West is a less dense neighbourhood of Amsterdam that was mainly built after the war and renovated between 1999 and 2019. The housing prices are lower than the city average.

fig. 114 ***Building ages***
source // author, based on data from Municipality of Amsterdam (n.d.)



housing value 2023, €/sqm
city scale

fig. 115 ***Housing values***
source // author, base on data from Municipality of Amsterdam (n.d.)

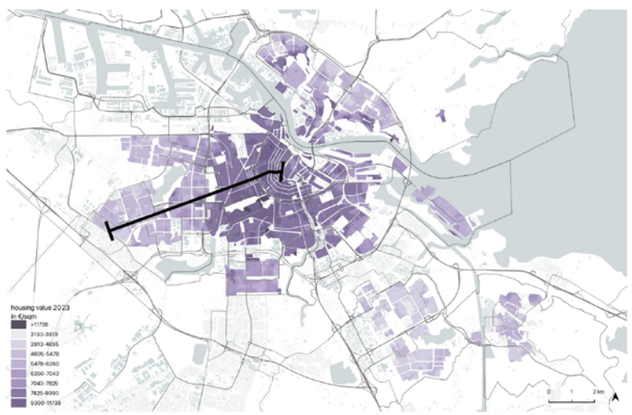


fig. 116 ***Building density***
source // author, based on data from PBL (2024)

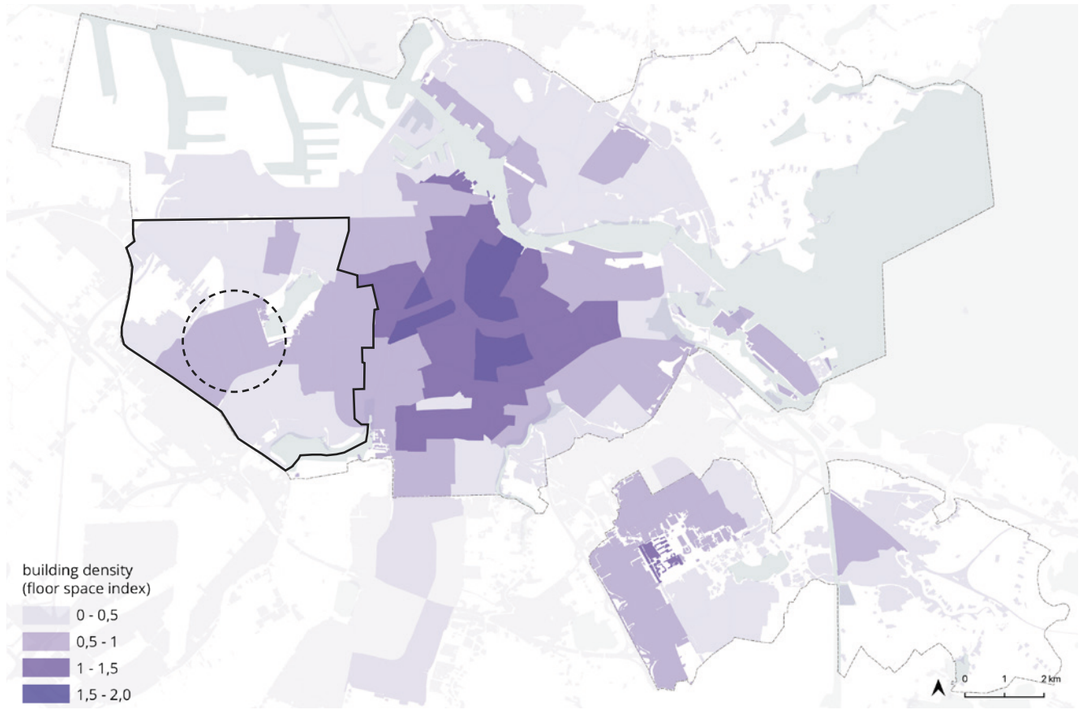
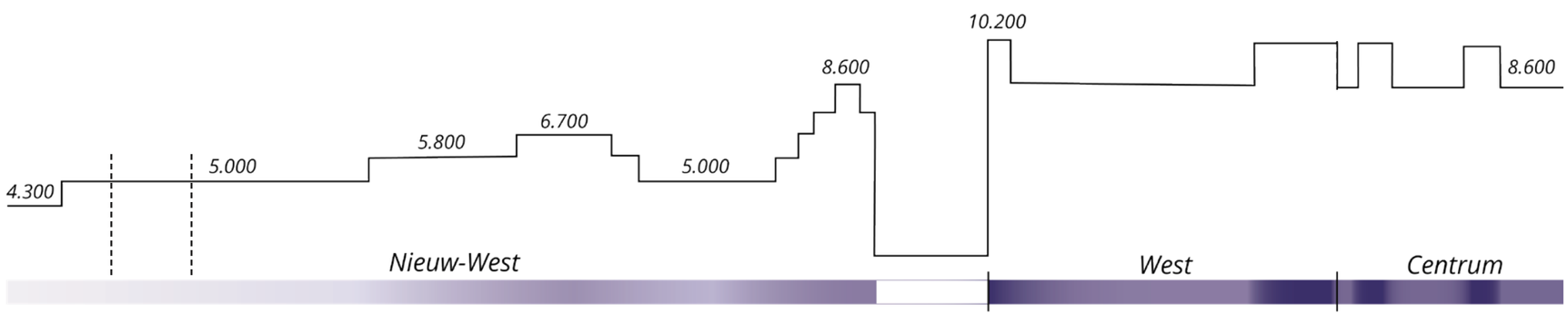


fig. 117 ***Section with housing values***
source // author, based on data from Municipality of Amsterdam (n.d.)



care for space?
what is the quality of public spaces?

The neighbourhoods are characterised by low quality public spaces that do not invite to linger, as well as one-story structures such as parking garages or commercial units as shown in the pictures.

fig. 118 ***One-story commercial building in resdiential courtyard***
source // google maps

fig. 119 ***Playground in residential courtyard***
source // google maps

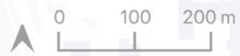
fig. 120 ***Neighbourhood square***
source // google maps

fig. 121 ***Parking garages as extension to residential block***
source // google maps

fig. 122 ***Pedestrian street as part of the Osdorp shopping center***
source // google maps

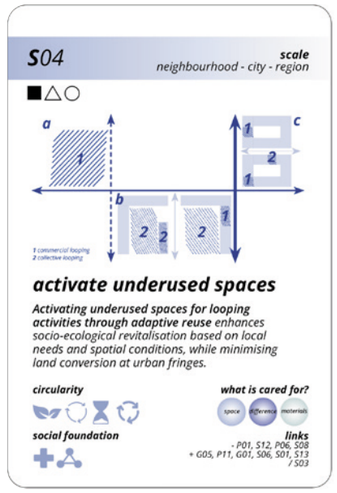
fig. 123 ***Parking garages between residential row houses***
source // google maps

fig. 124 ***Generous public square with small commercial units***
source // google maps



care for space?
how are functions distributed in space?

Overall, the area is characterised by monofunctional land use separated into residential commercial and industrial zones. Public spaces are of low quality, lacking amenities that support community interaction. However, there is significant spatial potential in the form of spacious courtyards and low-story parking garages, which present opportunities for adaptive reuse. These underused spaces could be activated and transformed into hubs for collective looping activities, thereby enhancing both the social and ecological quality of the neighbourhood. Another advantage is the quite large amount of social and cultural amenities, which could be utilised for textile looping activities as well.



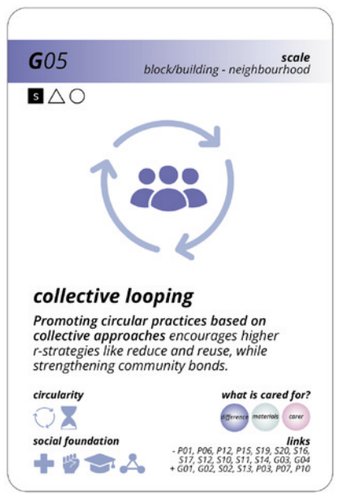


fig. 127 ***Land use, social & commercial amenities***
source // author, based on google maps

care for space?
availability & visibility of textile amenities

The spatial analysis shows that amenities related to linear textiles, are highly available throughout the area. These include typical clothing retail, residual waste container, online textile retail and retail of textile fabrics (in black).
Circular textile functions are much less available (in green). Those include two repair cafés, two rental shops and textile collection container. In contrast to the linear retail, located in two shopping centers (fig. 132, 130), the function of both repair cafés is not identifiable from street level (fig. 129, 133).

fig. 129 ***Repair café in a women's center***
source // author

fig. 132 ***Akerpoort Outlet***
source // google maps

fig. 130 ***Osdorpplein shooping center***
source // google map

fig. 133 ***Repair café in religious center***
source // google maps

fig. 131 ***Residual waste containers***
source // google maps

fig. 128 ***Textile related functions***
source // author,
based on Stichting LISA (2024)

care for time?
convenient accessibility of textile repair offers

The time/space analysis below (fig. 137) shows how far away repair café events are in walking minutes from an exemplary residential address. They are just happening a few times per month and usually between 10 and 12 am during the day. Tailors are even further away (fig. 136).

fig. 134 ***Tailor service***
source // author, February in Amsterdam Centrum

fig. 135 ***repair café sign***
source // author, March in Amsterdam Oost

fig. 136 ***repair café events (purple) and tailors (pink) with 5-min bike radius***
source // author, based on Repair Cafés in Amsterdam

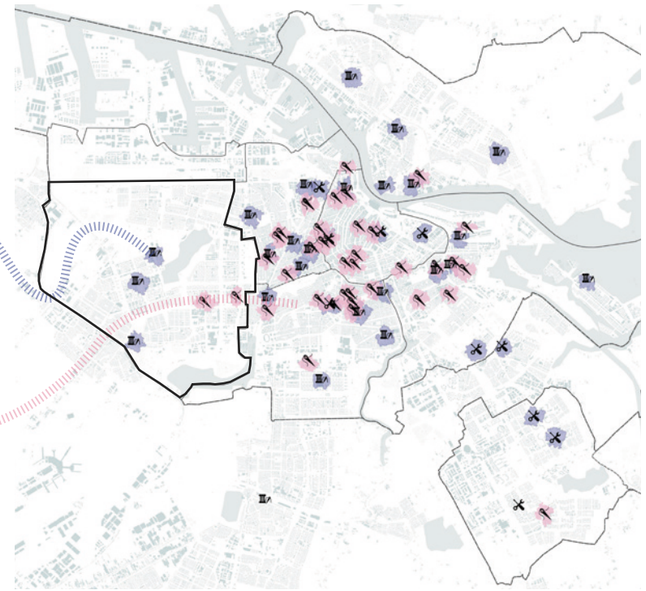
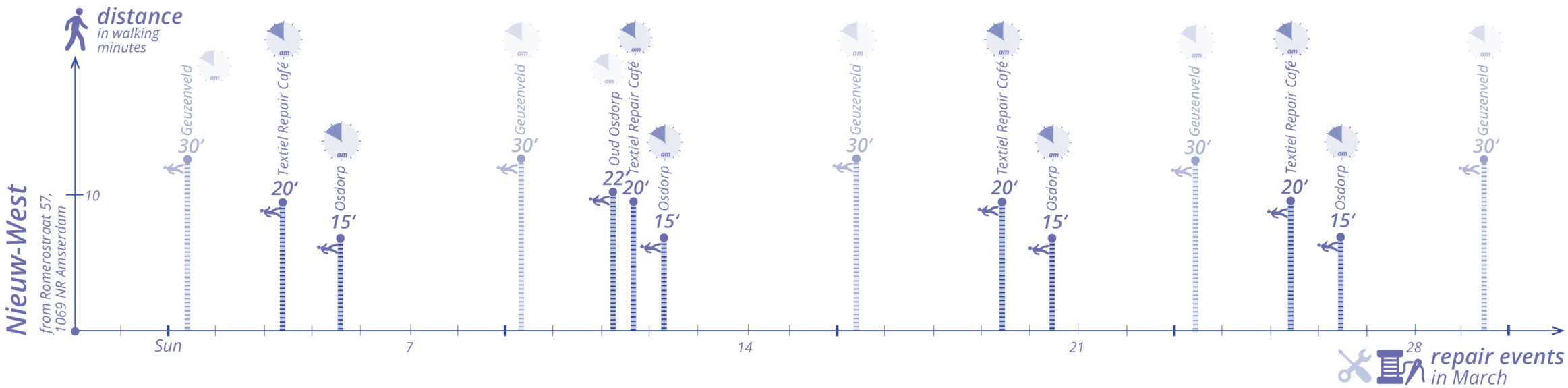


fig. 137 ***Time/space analysis of repir café events***
source // author



care for materials?
more linear than circular

The systemic section below (fig. 138) shows that material flows in Osdorp are mostly linear and connect to the region and port.

analysis conclusion
pilot area a

'care-less' aspects
- ***space:*** The area lacks in amenities for circular textiles and textile collection containers, repair café events lack in visibility, and in contrast linear clothing retail and residual waste containers are highly accessible. Moreover, communal courtyards and other public spaces are mostly neglected.
- ***carer & difference:*** Statistics state low levels of neighbourly help, many households with troubles making ends meet and low involvement of residents.
- ***materials:*** textile flows are mostly linear.

strategies
- ***space:*** providing community and market spaces for circular textiles, utilising underused spaces and adapting existing physical structures (reprogramming and filling voids) to enhance spatial quality.
- ***difference:*** addressing social pressures by enabling affordable circular textiles, while enhancing social interaction

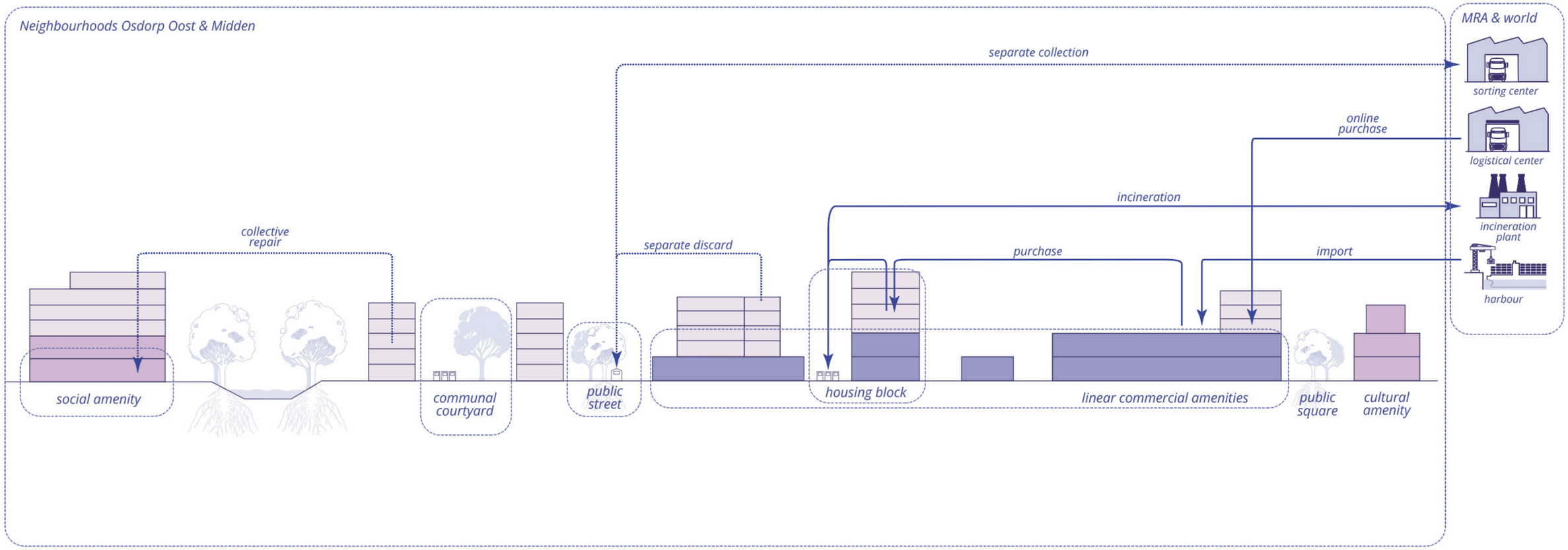


fig. 138 ***Systemic section showing reprogramming and textile flows through pattern implementation***
source // author

pilot a strategy
neighbourhood scale

Figure 139 shows how commercial and collective textile looping functions are placed within the district quarter with the design principles on the left.

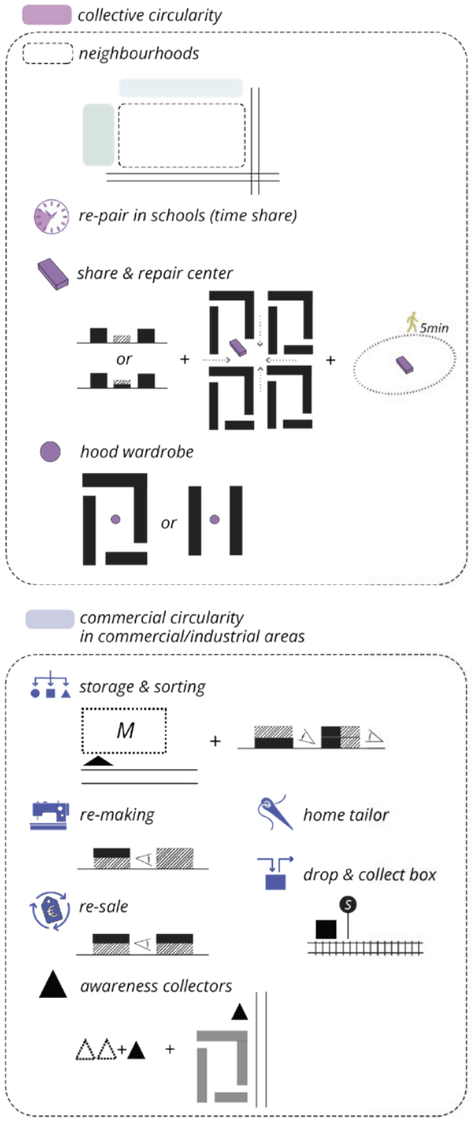


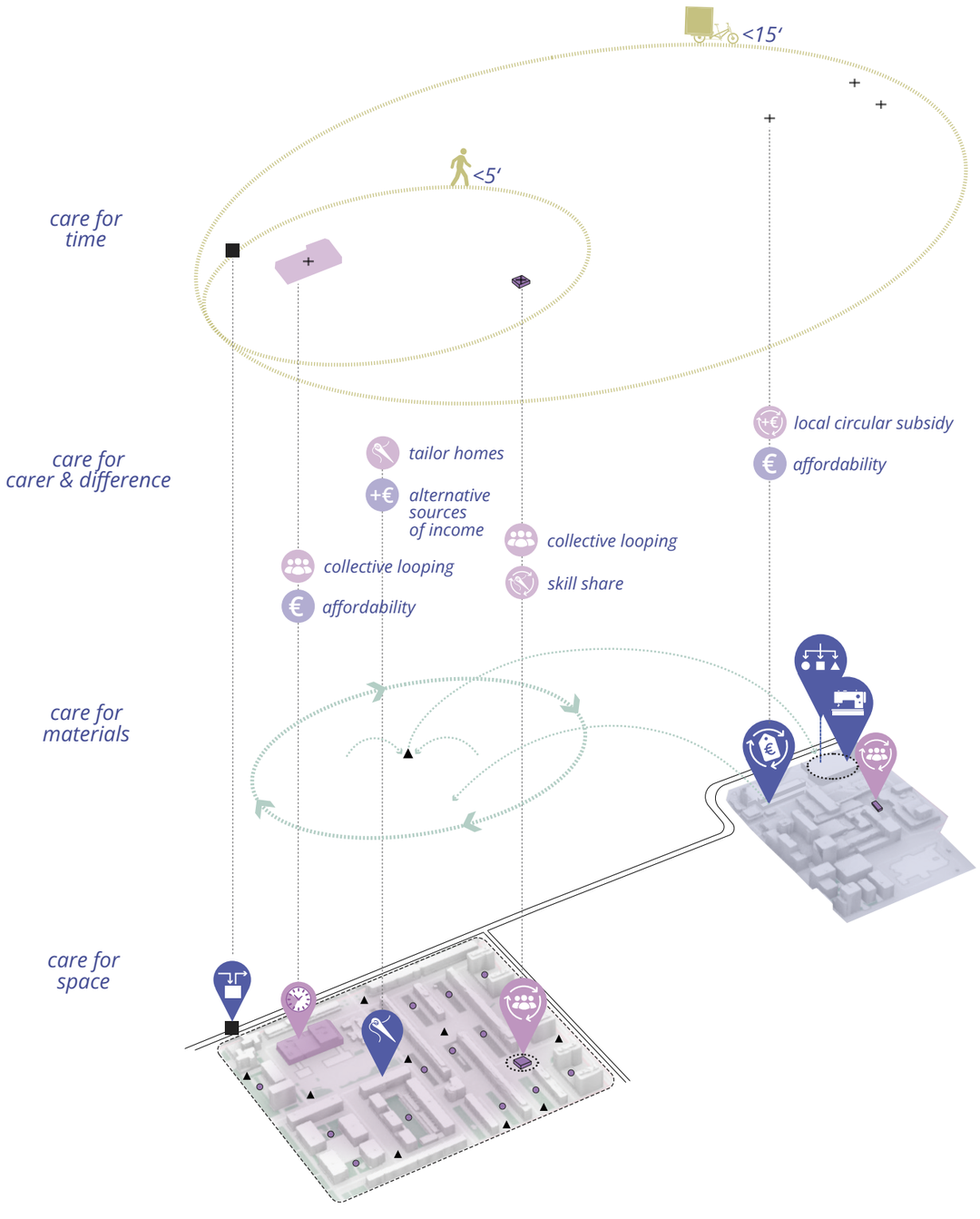
fig. 139 ***Axonometric view with distribution of new functions***
source // author

pilot strategy
neighbourhood scale

Figure 146 shows how the strategy integrates five layers of care, including:
1. care for space by diversifying the land use through interventions for collective and commercial looping.
2. care for materials & time by closing textile loops first within the neighbourhood by encouraging textile exchange and repair combined with social functions within 5 minute walking distance and second connecting surplus textile flows to the commercial site, where they are sorted, and then immediately resold, repaired and re-made for the whole district quarter within 15 minute cargo-bike access to allow low-emision collection from the neighbourhoods.
3. care for carer & difference by firstly, providing infrastructure for local communities to organise textile looping activities collectively and secondly, providing spaces for skill sharing and allowing local residents an alternative source of income by providing infrastructure such as drop & collect boxes to enable home tailoring services.

The following pages will demonstrate the implementation of the highlighted facilities and functions for collective looping and commercial looping within these areas.

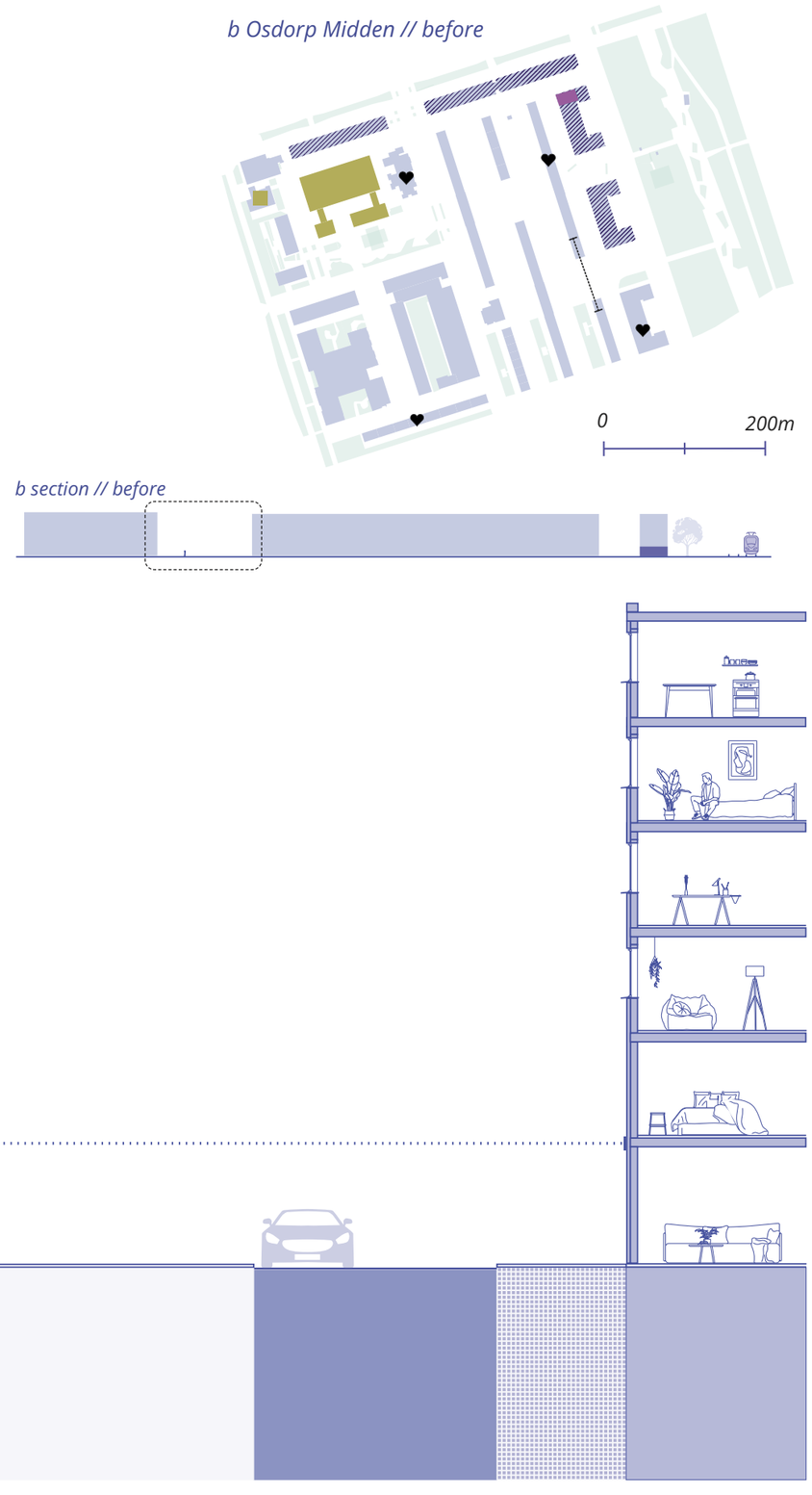
fig. 140 ***Five layers of care in Osdorp***
source // author



collective looping
location for the share & care center

This site was selected for the development of a share & care café because of its significant spatial potential and currently low level of utilisation. The vast available space provides flexibility for creating multifunctional areas dedicated to community activities, such as textile repair and social gatherings. By activating this underused site, the project aims to foster community engagement, support circular practices, and enhance the overall quality and livability of the neighbourhood.

fig. 141 ***Drawings showing the current condition***
source // author



pilot strategy
collective looping: share & care center

This sections demonstrate that there is sufficient space between the residential blocks to accommodate ‚share & care cafés' for collective clothing repair and re-making, community building, education and skill-sharing. It also enhances the spatial quality of the previously almost empty square by providing infrastructure that can be flexibly used by the local residents.

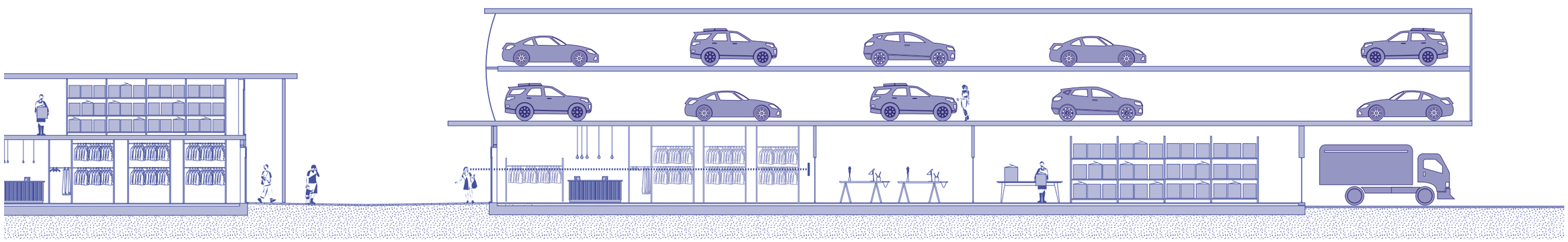
fig. 142 ***Design drawings for collective looping situation in Osdorp Midden***
source // author

pilot strategy
commercial looping: re-make hub

This site was chosen for the development of a resale and re-make hub due to its considerable spatial potential and its current concentration of linear retail activity. Its extensive retail floor area and large car parking facilities offer significant flexibility for adaptive reuse and transformation. The success of this transition is depends on an ongoing mobility transition, which will reduce reliance on car-centric infrastructure and open up new possibilities for more sustainable, urban manufacturing and circular activities.

b land use map // before

b section // before



pilot strategy
commercial looping: re-make hub

This section shows the transformation from a linear retail center with car parking garage into a diversified and inviting circular textile hub, where clothes are being remade, sorted, stored and resold.
The architecture is open and transparent with a flow of zones that allow direct access, and interaction with workshops and lastly observation to let visitors exprience textile circularity directly and indirectly raising awareness.

a land use map // after

0 100m

a section // after

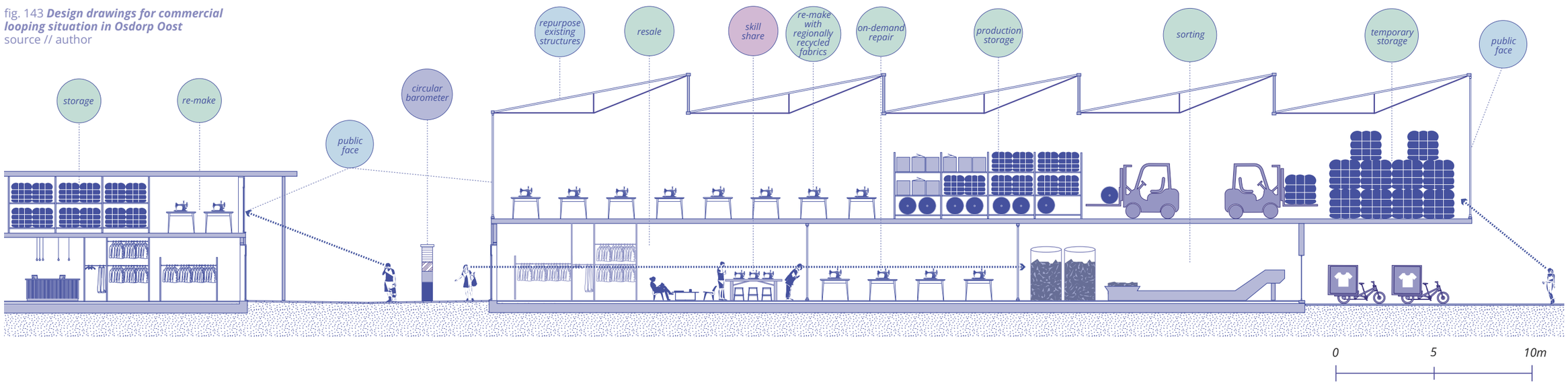


fig. 143 ***Design drawings for commercial looping situation in Osdorp Oost***
source // author

care for materials
pilot project a

Implementing the ‚care-full' patterns at the neighbourhood scale in Osdorp diversifies functions horizontally and vertically and connects them through circular textile flows by repurposing existing commercial structures and activating underused spaces such as communal courtyards.

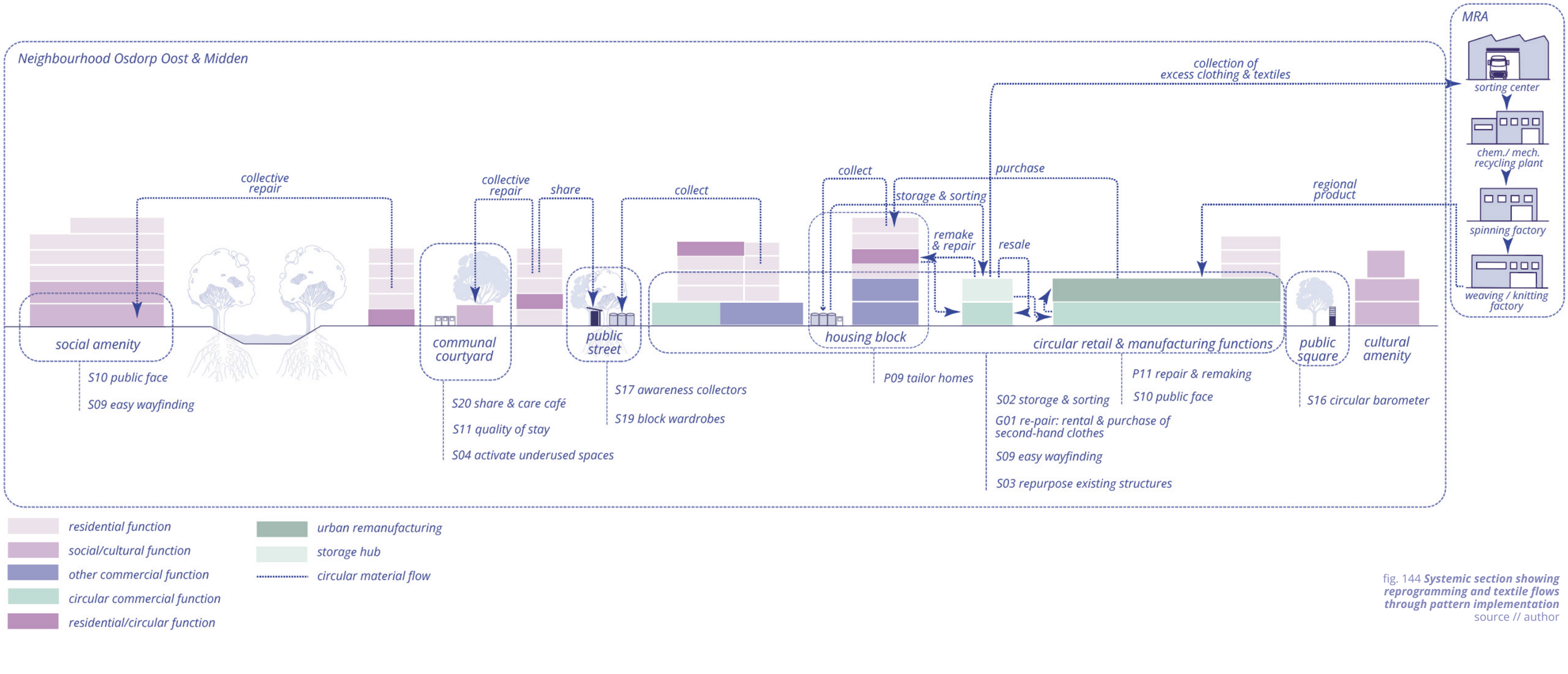


fig. 144 ***Systemic section showing reprogramming and textile flows through pattern implementation***
source // author

pilot project b
Amsterdam Centrum

This section of the report demonstrates how the local loop strategy can be implemented in high-density urban areas with limited spatial potential, where textile amenities primarily focus on linear consumption and lack access to circular textile infrastructure. The section demonstrates the integration of collective looping facilities at the five-minute neighborhood scale and commercial looping functions at the 15-minute scale, both of which are tailored to the spatial and social context.

fig. 145 ***Local loop spatial strategy***
source // author

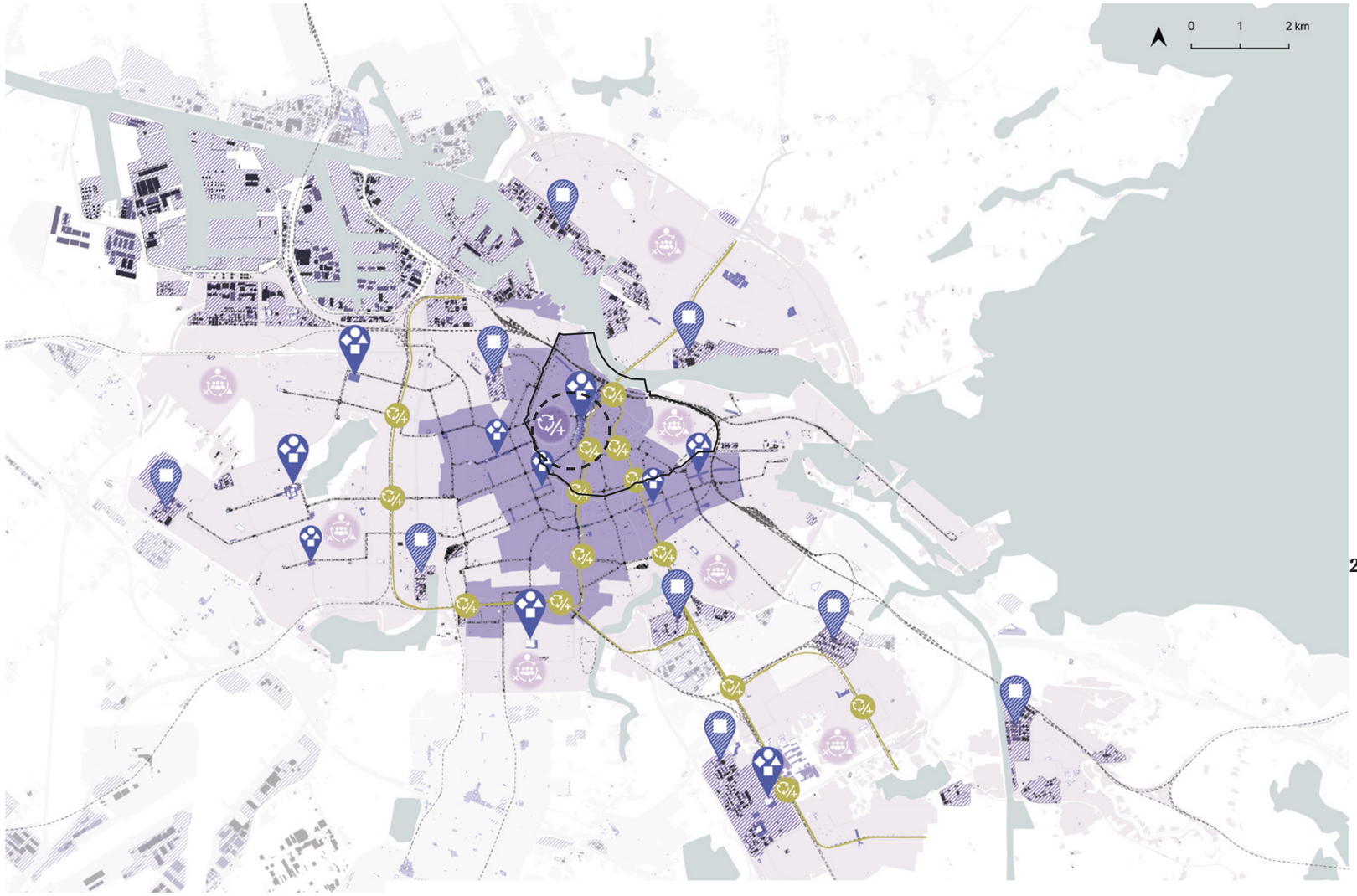
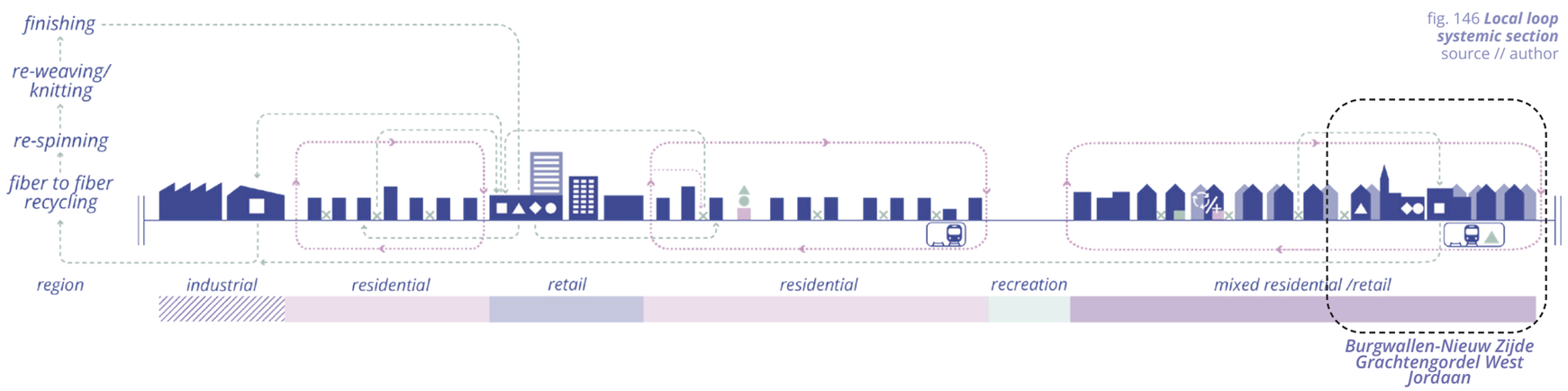


fig. 146 ***Local loop systemic section***
source // author



‚care-full' circular pattern language VI

pilot project b
Amsterdam Centrum / X neighbourhood

The second pilot area is in Centrum Amsterdam, which is in contrast to the more residential Nieuw-West a mixed residential/commercial area with high textile retail density. This area was chosen to be tested for how the ‚care-full' approach could work, because it poses different spatial challenges than Nieuw-West but also social pressures such as loneliness and low social cohesion.

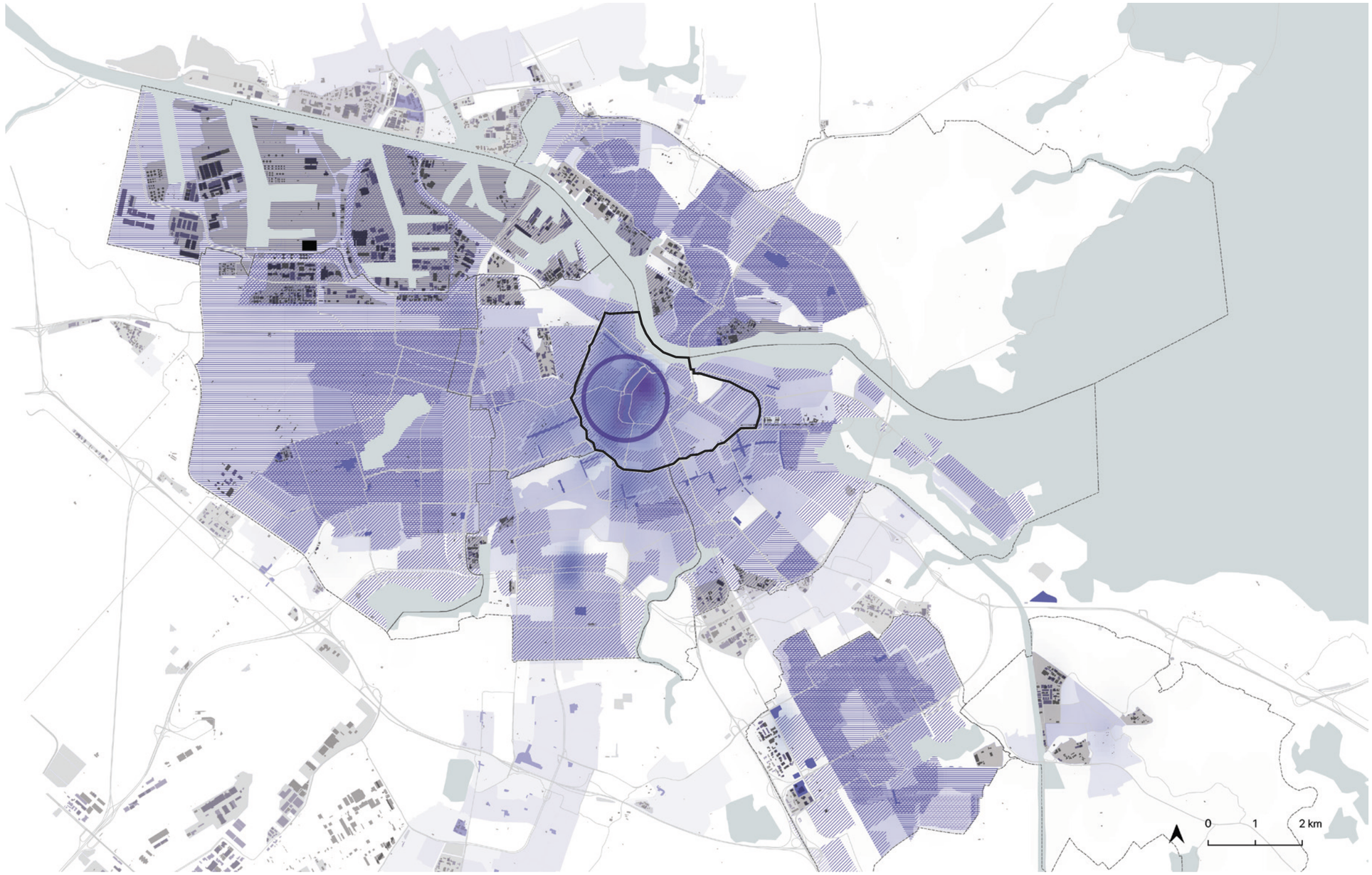


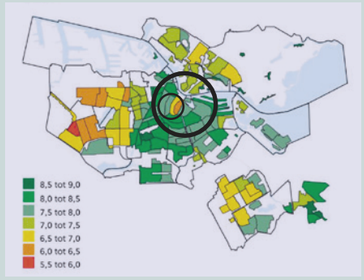
fig. 147 ***Conclusion map of challenges in Amsterdam***
source // author

care for difference
socio-economic profile of Amsterdam Centrum

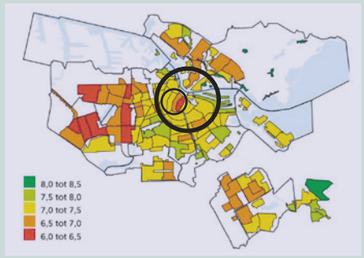
The socio-ecological profile of the district shows that more individuals are highly educated, have higher average income and living alone than the Amsterdam average (Municipality of Amsterdam, 2024).
The housing survey shows that the residents, especially in the neighbourhoods near the center of Centrum are generally more dissatisfied with different factors than in other neighbourhoods as shown in the maps fig. 148 (Municipality of Amsterdam, 2024).

fig. 148 ***Maps of housing survey***
source // Municipality of Amsterdam (2024)

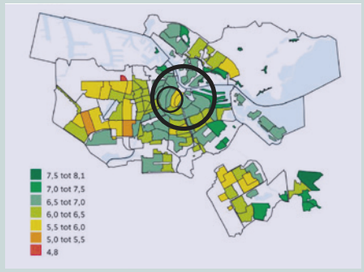
satisfied to unsatisfied
with own neighbourhood



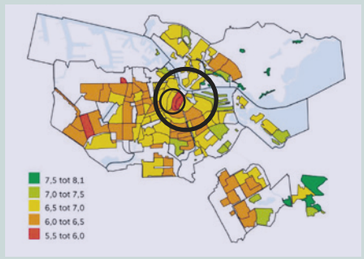
unpleasant
contact with other people



medium to high involvement
of local residents



never or very little
helping each other



91.700 *inhabitants in 2023*
4,4 % *decline until 2050*

lowest percentage of population ***< 18***
highest percentage of elderly people between ***65-74 years***

63 % *single-person households*
Amsterdam average = 54%
24 % *couple without children*
Amsterdam average = 22%

80% *of inhabitants have basic qualification*
Amsterdam average = 71%
62% *of the population aged 15 to 74 has higher vocational education or university degree*
Amsterdam average = 48%

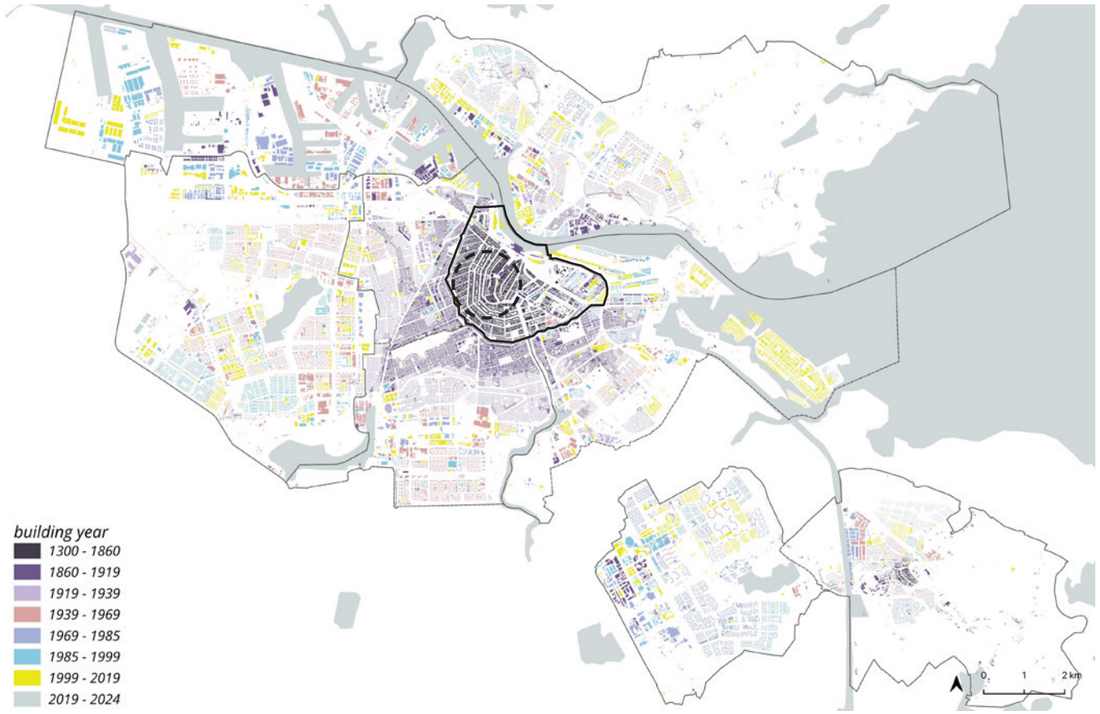
55.300€*/year (=high average) mean disposable income per household*
Amsterdam average = 48.700€/year
17,5% *low income households*
Amsterdam average = 20%
37% *of population >18 has difficulty to make ends meet*
Amsterdam average = 36%
6% *of long-term minimum income*
Amsterdam average = 10%

50% *migration background*
Amsterdam average = 60%
23% *European background (excl. Netherlands)*
10% *Asian*
9% *American and Oceaniën*

care for space?
housing value, building age and building density

Amsterdam Centrum is one of the most dense areas of Amsterdam that was mainly built from the year 1300 on. The housing prices are highest in this part of the city, which could pose a challenge to implement new less-profitable circular functions.

fig. 149 ***Building ages***
source // author, based on data from Municipality of Amsterdam (n.d.)



housing value 2023, €/sqm
city scale

fig. 150 ***Housing values***
source // author, based on data from Municipality of Amsterdam (n.d.)

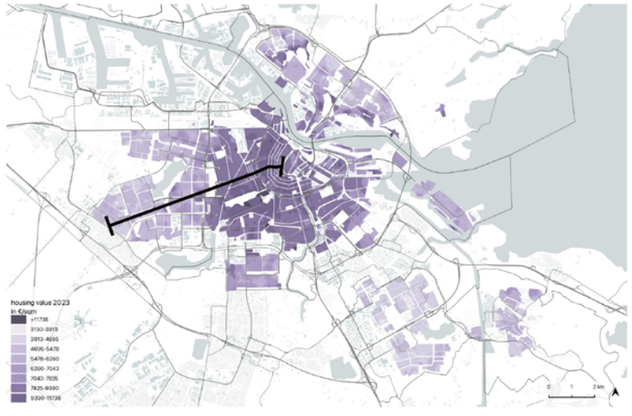


fig. 151 ***Building density***
source // author, based on data from PBL (2024)

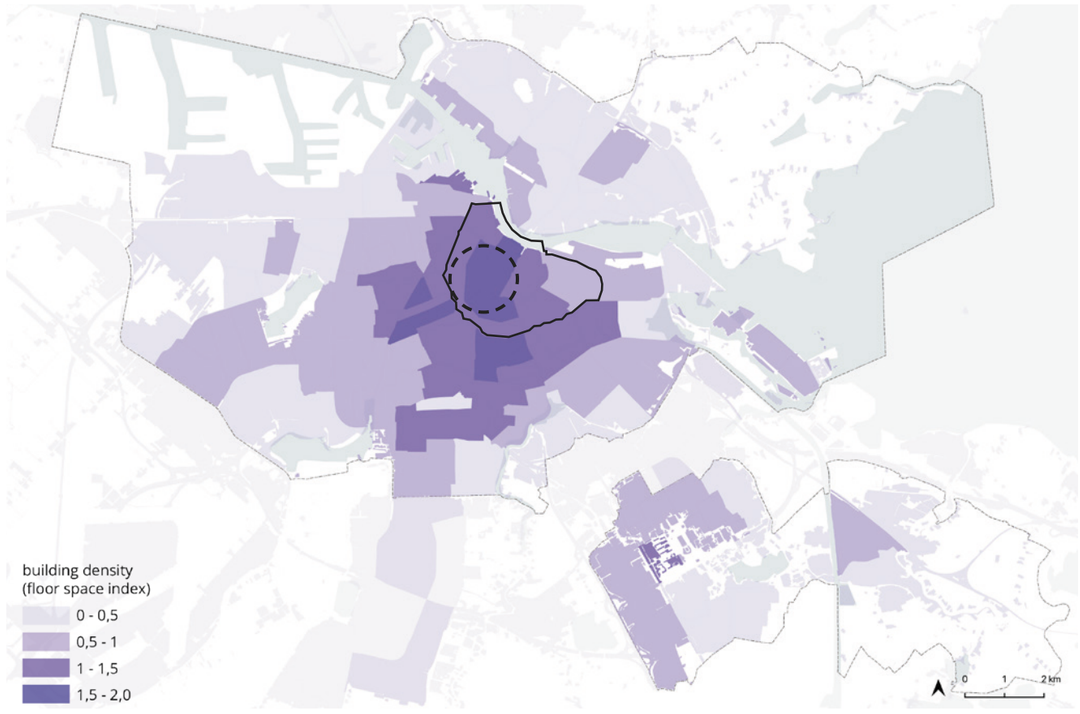
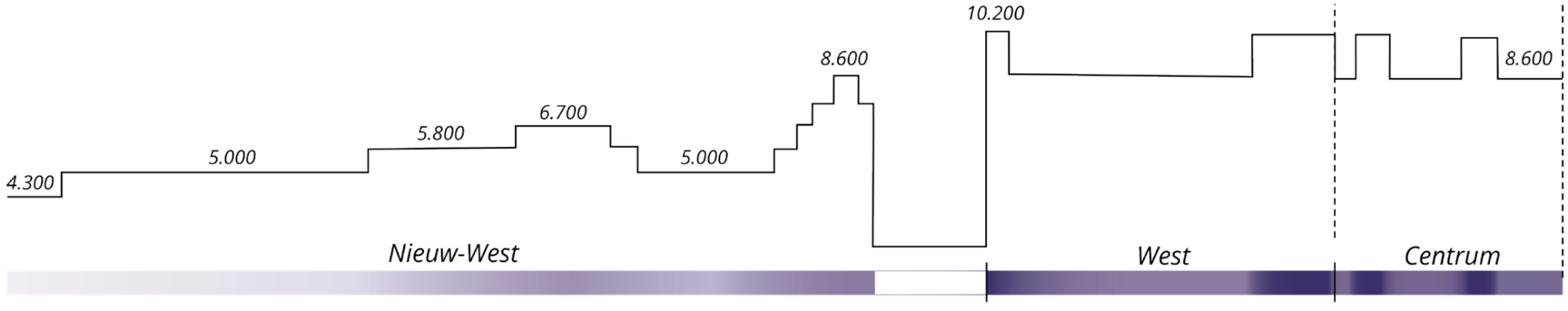


fig. 152 ***Section with housing values***
source // author, based on data from Municipality of Amsterdam (n.d.)



care for space?
availability & accessibility of textile amenities

The spatial analysis shows that a few circular textile opportunities are available along main shopping streets. However, linear retail makes up the majority and is therefore more conveniently accessible for consumers, which may lead to more linear textile consumption.

fig. 153 ***map of linear and circular textile amenities***
source // author

circular textile amenity
linear textile amenity

0 50 100 m

care for space?
visibility & adaptability of textile amenities

The visual permeability, legibility and personalisation (McGlynn et al., 2012) are key for determining the visibility of circular textile functions at street level, sich promotes or limits awareness of consumers. It is defined by how amenities present their functions and programmes through visual characteristics on the exterior and how permeable their facades are, for example glas front with displayed items vs. curtains hiding function.
Firstly, the analysis shows that commercial amenities (both for linear & circular shopping) have higher visibility in the core retail street compared to secondary shopping street. There seems to be more free play in the facade design, and in the secondary street the original facadesare are being preserved.
Secondly, it shows that there is a difference between the visual permeability and legibility of commercial and of communal textile amenities. Commercial linear textile retail tends to be more open to customers, while communal amenities tend to be more introvert, not welcoming everybody from the street, but groups that already know about the amenity.
Thirdly, another result is that circular amenities generally have lower legibility than linear ones.

Another aspect that was investigated is the robustness of the amenities, which relates to the condition in which amenities may be open for other social uses beyond the planned ones, such as gathering and lingering (McGlynn et al., 2012). The communal amenities show more robustness (on the inside) than commercial ones. Since there is a general challenge of loneliness and low social cohesion in the city and in Centrum, enhancing robustness in circular amenities could be a potential strategy to address this issue and also enhance attractiveness of circular options.

fig. 154 ***table showing results of the visibility analysis***
source // author

care for time?
convenient accessibility of circular textile options

The time/space analysis below (fig. 158) shows how far away repair café events are in walking minutes from an exemplary residential address. They are just happening a few times per month and usually in the early afternoon, while she usually works. Therefore, they are not a convenient choice for the residents living at the exemplary address.

fig. 156 ***Repair café sign***
source // author, March in Amsterdam Oost

fig. 157 ***Repair café events with 5-min bike radius***
source // author

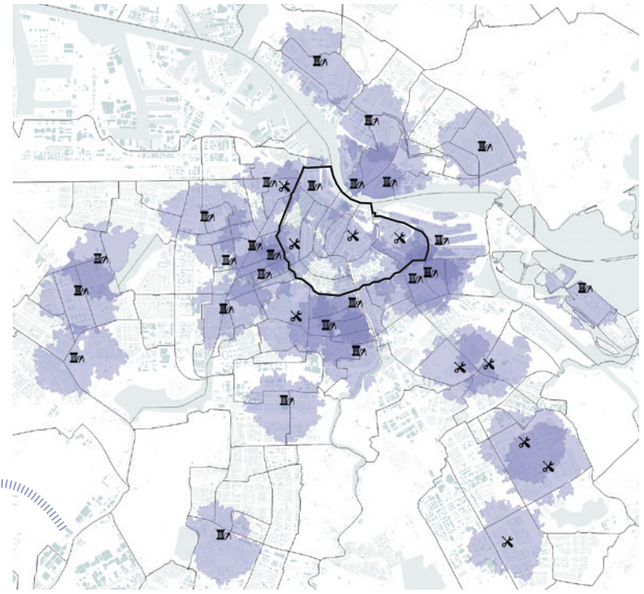
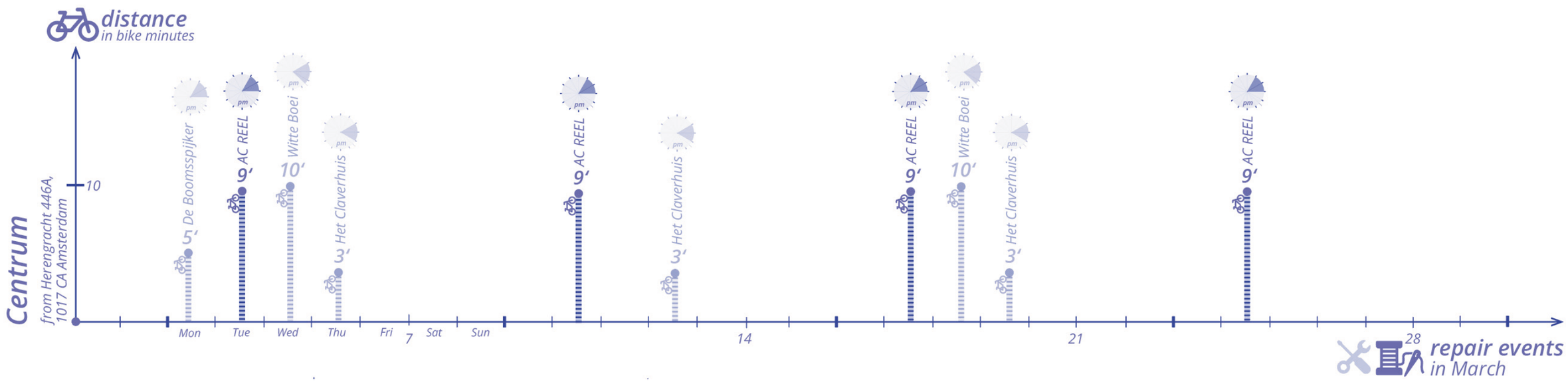


fig. 158 ***Time/space analysis of repair café events in Centrum***
source // author



care for materials?
material flows in space

The section (fig. 159) shows that textile flows are both circular and linear connected to local amenities, the region and through the port with the world.

analysis conclusion
pilot area b

'care-less' aspects
- ***space:*** the area has the highest levels of land value and private land ownership defines commercial, profitable land use combined with low visibility, accessibility & availability of circular options.
- ***carer & difference:*** statistics state low levels of social cohesion, and satisfaction with the neighbourhood.
- ***materials:*** there is no separate textile collection through containers, therefore textile flows are mostly linear.

strategies
- ***space:*** enhancing the visibility and wayfinding of existing circular tetxile functions to raise awareness and mitigate linear overconsumption, as well as allocating more space for commercial and collective circular practices and services through strategic co-location of functions
- ***carer & difference:*** addressing loneliness by boosting collective circular textiles to enhance social interaction

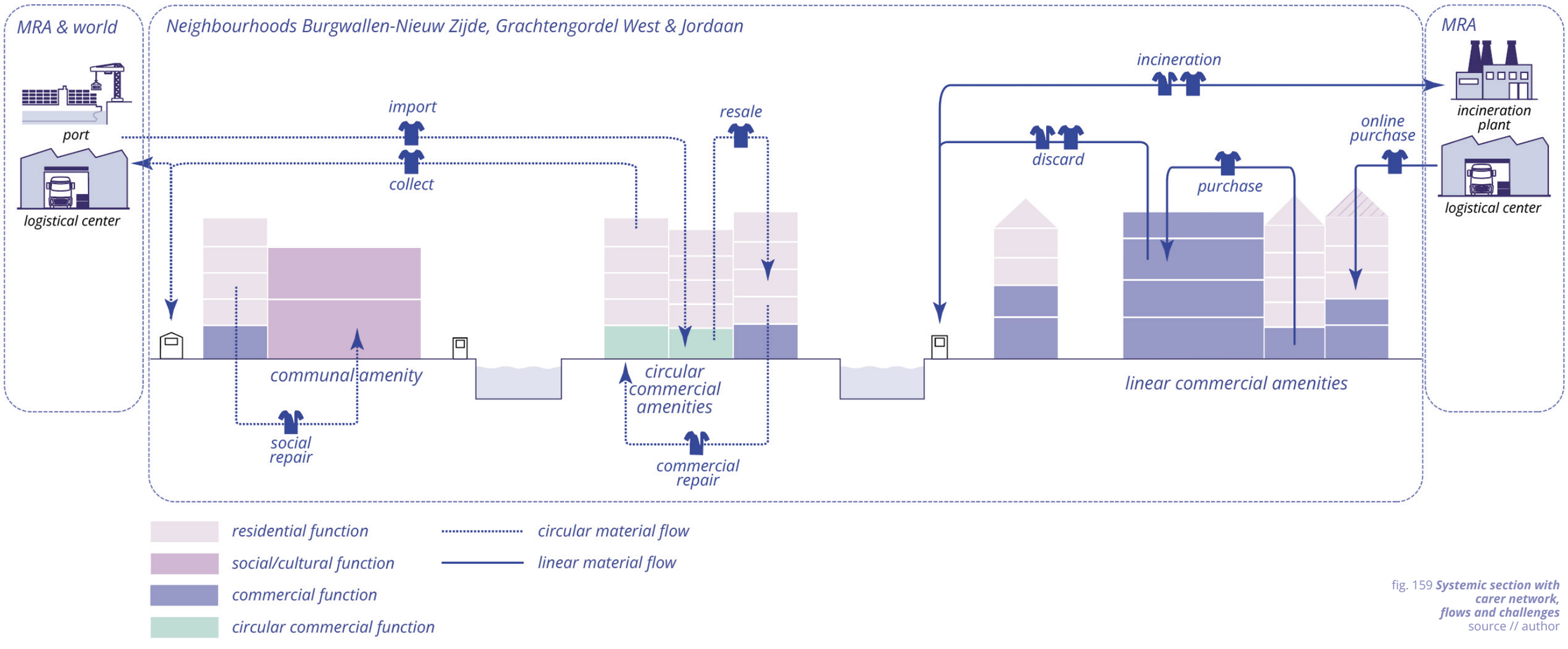


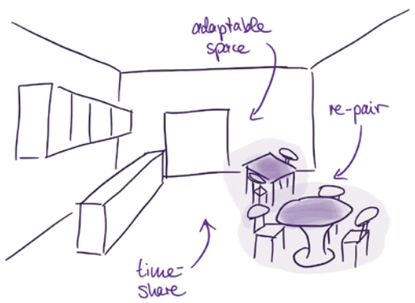
fig. 159 ***Systemic section with carer network, flows and challenges***
source // author

spatial potentials
for ‚care-full' intervention

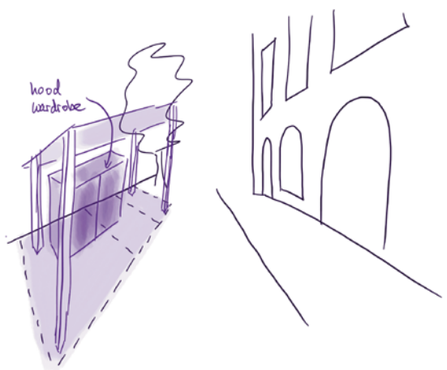
Since Amsterdam Centrum is one of the densest districts of the city, spatial potentials focus on changes in the programming of existing facilities, as well as underused corners or parking spaces in the public space. There is very little common courtyards that could be utilised for community functions.

fig. 160 ***Aerial view of Amsterdam Centrum with the core shopping street Kalverstraat and subordinate shopping street Elandsgracht***
source // google earth, adapted by author

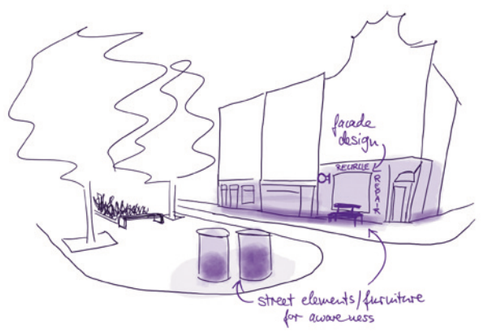
fig. 161 ***Design srategies for potential spaces***
source // author



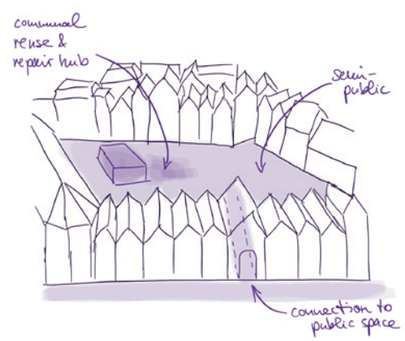
public (1) & commercial (2) amenities ground floors



parking spaces (3)



streets / intersections / facades (4)



courtyards / blocks (5)

programmatic ***structural***

pilot b strategy
neighbourhood scale

Figure 162 illustrates the spatial distribution of commercial and collective textile looping functions within the district quarter, guided by the design principles listed on the left. One specific 're-pair' spot is highlighted in the figure; this location is presented in further detail on the next page.

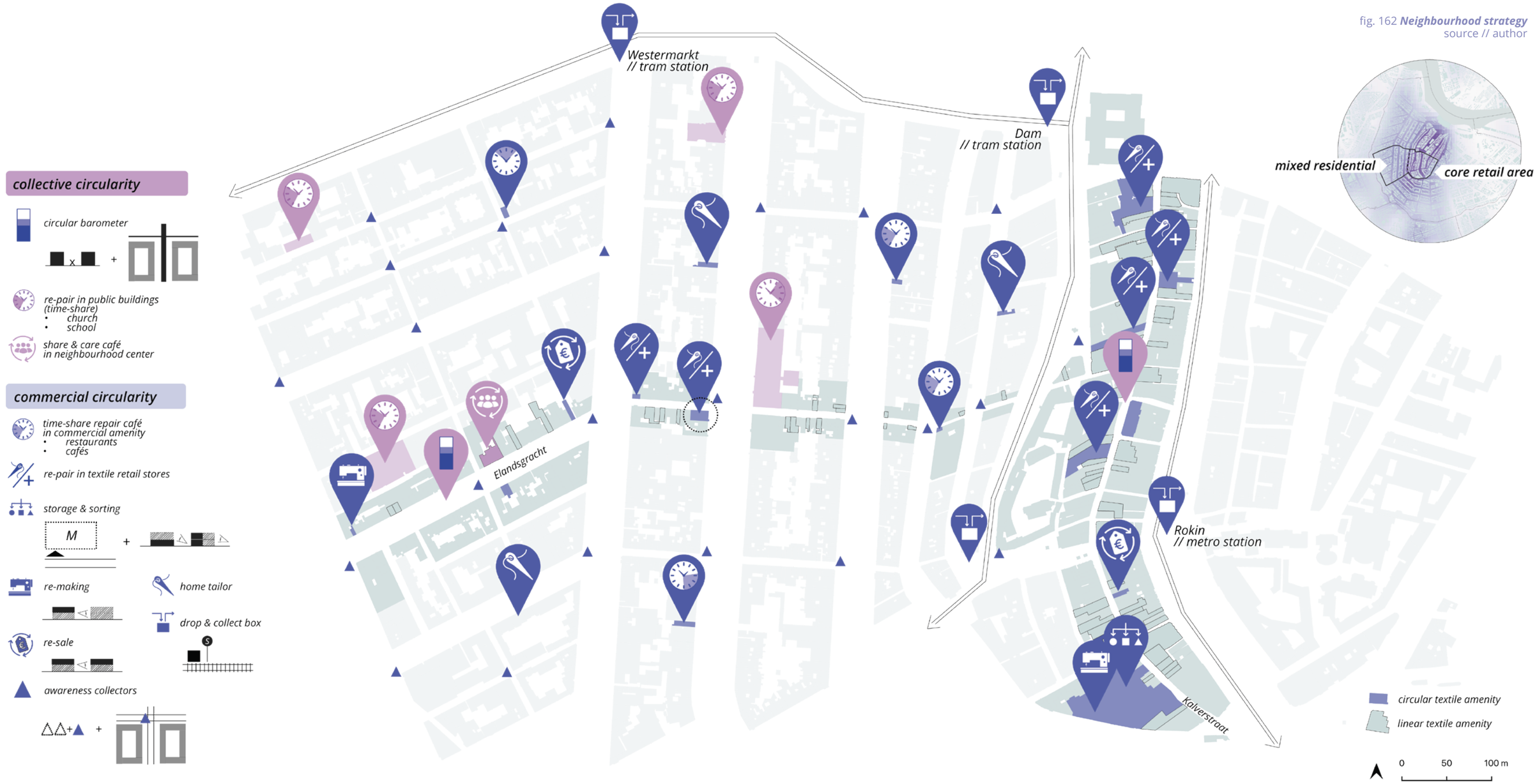


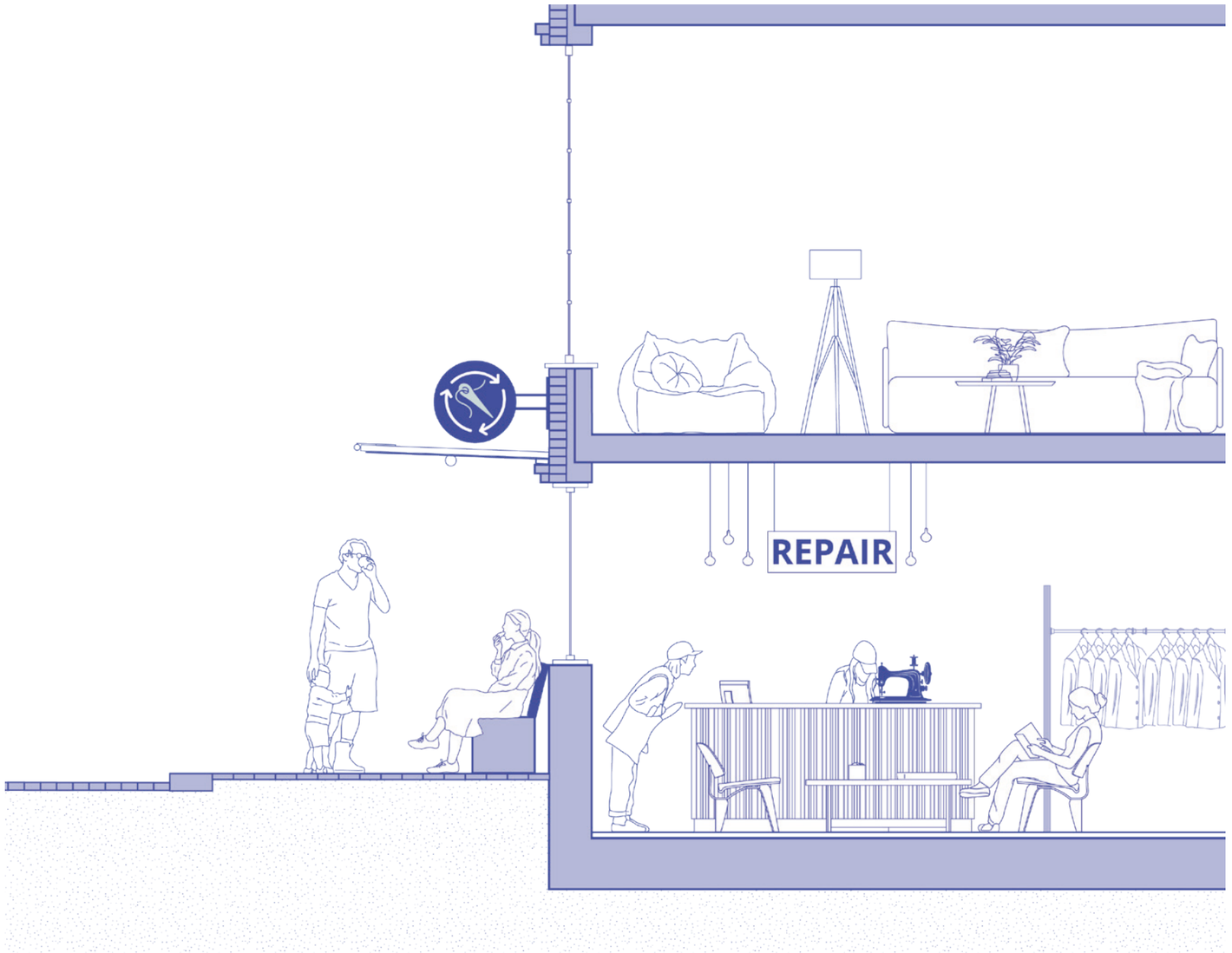
fig. 162 ***Neighbourhood strategy***
source // author

commercial ‚re-pair'

This location currently features a second-hand store for clothing, which is not easily identifyable, since it has small deep windows and lies lower than street level. Still, the street level impression (fig. 163) shows, that it already invites to sit and rest, even though it is not designed for this. The proposed intervention, shown in fig. 164, starts with improving the facade, adding a standardised sign to enhance visibility and wayfinding and introducing seating options to attract people. Secondly, by introducing repair and re-making as an added service to the resale of clothing within the store, the intervention not only increases the store's functionality but also transforms it into an active community hub. This dual approach aims to boost foot traffic, foster social interaction, and promote circular textile practices in a more accessible and inviting environment. This added service can be incentivised by a circular subsidy, which is offered to initiatives that promote textile looping locally.

fig. 164 ***Design section***
source // author

fig. 163 ***Street level impression of second-hand store on a street corner***
source // google streetview



evaluation

VII

evaluation
of pattern language, spatial vision & strategy

One of the central aims of this thesis was to explore whether and to what extent a 'care-full' spatial planning approach can operationalize the Doughnut framework, which proposes an abstract compass for transitioning the economy towards protecting the global and local social foundation and ecological boundaries. To keep the project focused and manageable, the research concentrated on a single economic sector: the textile value chain.

This section of the report evaluates in qualitative terms how, and to what degree, the proposed pattern language for a 'care-full,' circular, and regional textile value chain in the Metropolitan Region of Amsterdam addresses the social and ecological dimensions of the Doughnut framework.

Overall, the ‚care-full' approach to a circular textile value chain addresses the four aspects of the social foundation significantly, except enhancing citizen's health, which was due to the project's scope on the textile sector. Furthermore, it addresses ecological targets set out by the municipality, government or the original Doughnut by Kate Raworth (2017).

Side note: The inner rings represent the extent to which the respective aspects are addressed in this thesis to build a social foundation, which contrasts the visual concept of the overshooting Doughnut. The following pages explain more in detail how they are addressed.

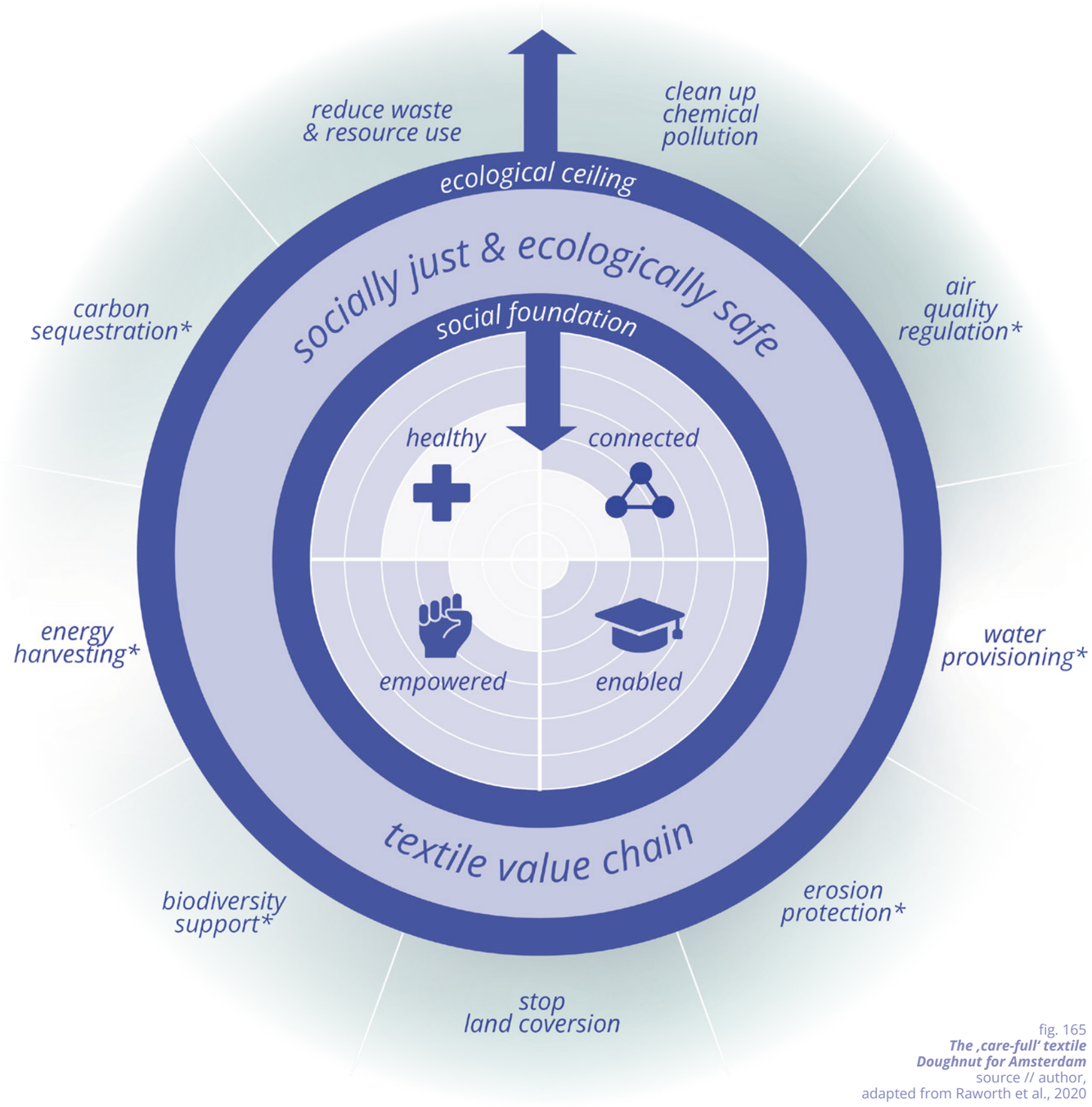


fig. 165
The ‚care-full' textile Doughnut for Amsterdam
source // author, adapted from Raworth et al., 2020

* *official target of the Amsterdam City Doughnut*

how socially just is a ‚care-full' textile value chain?

evaluation of the social foundation dimensions of the textile Doughnut

The assessed aspects of the social foundation include targets from the Amsterdam City Doughnut and were extended with indicators from the Broad Prosperity Index (Brede Welvaart – bw) and the Livability Barometer (Leefbarometer – lb), as both frameworks aim to capture the multidimensional nature of quality of life and social wellbeing at local and national scales. More specifically, spatial indicators related to the living environment were added, such as physical surroundings and access to amenities, as these are particularly relevant to the project's spatial focus.

Overall, this thesis demonstrates how a 'care-full' spatial planning approach can help operationalise the Doughnut's social foundation by embedding socially just practices into the circular textile transition. Through a pattern language of interconnected spatial, policy, and governance strategies, the project addresses multiple dimensions of social wellbeing, including connectedness, empowerment, income security, access to amenities, and health. The sector-specific scope of this thesis means that not all dimensions, such as food, housing, and safety, are tackled. However, the proposed interventions significantly enhance community cohesion, enable fair and inclusive work opportunities, and foster active citizen empowerment. However, the proposed interventions significantly enhance community cohesion, enable fair and inclusive work opportunities, and foster active citizen empowerment. By focusing on caring for people and spaces, the approach supports an equitable, locally grounded textile value chain that aligns with broader ambitions of the Doughnut framework.

The inner rings represent the extent to which the respective aspects are addressed in this thesis to build a social foundation, which contrasts the visual concept of the overshooting Doughnut. The following pages explain more in detail how they are addressed.

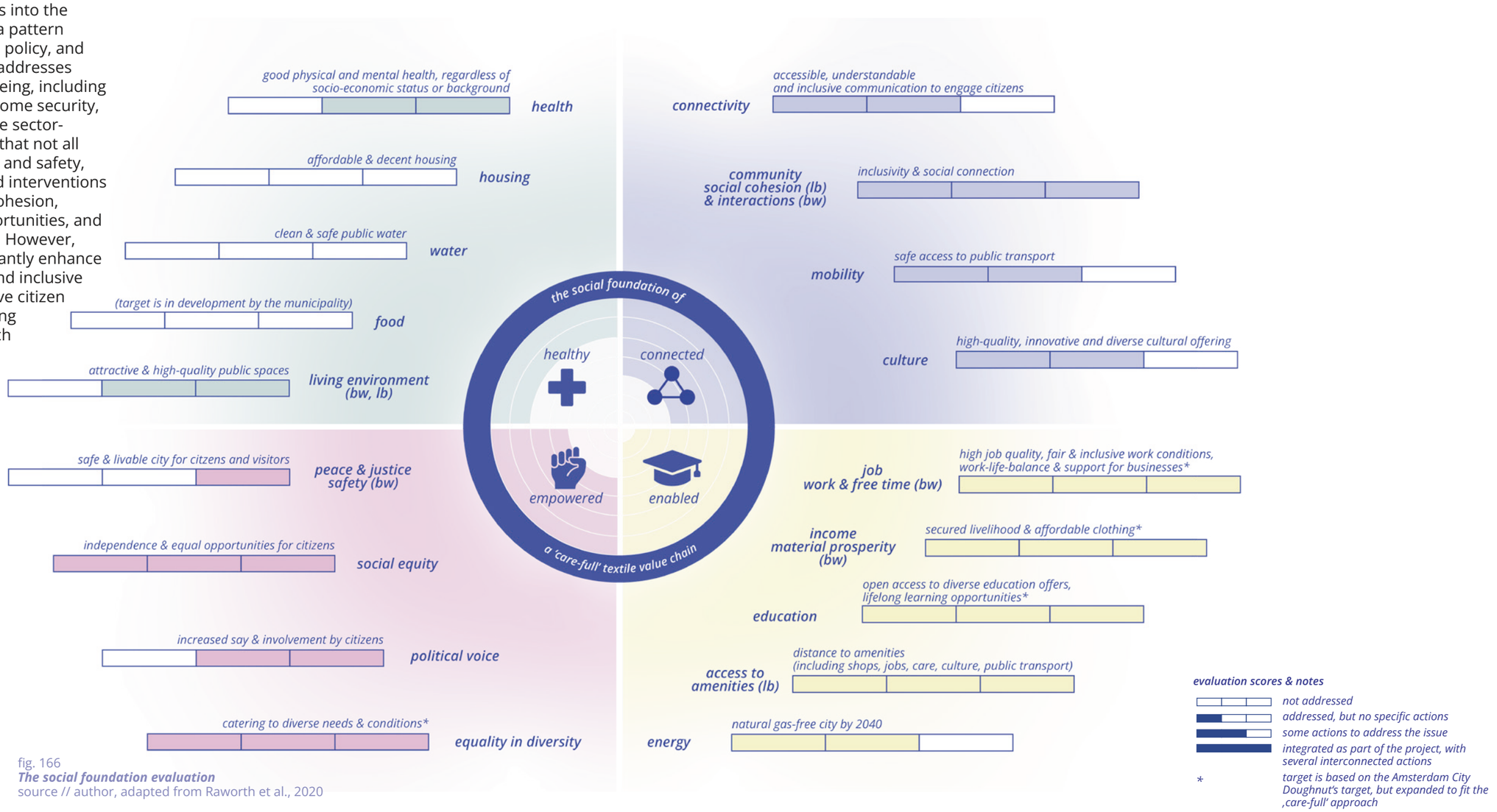


fig. 166
The social foundation evaluation
source // author, adapted from Raworth et al., 2020

how socially just is a ‚care-full' textile value

evaluation of the social foundation dimensions of the textile Doug

One of the four key dimensions of the Doughnut framework's social foundation addressed in this thesis is social connectedness. To assess this aspect, four sub-factors were evaluated.

1. connectivity

This thesis proposes two spatial strategies - (*S09) easy wayfinding and (S10) public face* - to enhance the visibility and legibility of circular textile services. These strategies aim to improve citizen engagement by improving the communication of circular options through both physical and digital measures.

2. community cohesion

Building community cohesion is one of the main goals of the ‚care-full' approach for Amsterdam. It proposes interrelated actions to address this by putting forward the approach of (*G05) collective looping* that is supported by a network of spatial, policy and governance strategies - *S20, S19, S11, S12, S14, P06, P15, G01*.

3. mobility

This thesis specifically addresses the accessibility of circular workplaces for carers by proposing the development of new circular textile work hubs - such as (*S06) synergy clusters* - in combination with strategy *(S15) strategic access to public transport*, ensuring equitable and convenient mobility options for carers.

4. culture

Strengthening local cultural offerings was not a primary objective of this thesis. However, the proposed development of spaces for *(G05) collective looping*, combined with *(S12) flexible spaces*, enables the emergence of interactive cultural opportunities. These include textile-related learning and crafting, while also accommodating broader cultural uses such as art workshops and language classes.

The second key dimension addressed is the extent to which the proposed 'care-full' textile value chain enables citizens in regard to:

5. job & free time

One of the main aspects of the ‚care-full' approach is caring for carers. Therefore, this project proposes a set of interconnected strategies to 1. ensure (*P08) fair work conditions,* 2. support circular businesses (*P16 local circular subsidy)* and 3. enable connecting workers with employers with the (*G03) circular match-maker*, and lastly by improving life-work-balance through *(S15) strategic access to public transport* of work places and proposing more accessible cultural offers (point 4. and 8.).

6. income

This thesis proposes the implementation of a policy for *(P14) alternative sources of income* in combination with *(P09) tailor homes* to secure livelihoods of citizens that have trouble making ends meet. Furthermore, the apporach of *(G05) collective looping,* supported by a *(P16) local circular subsidy* enhances the *(P15) affordability* of clothing.

7. education

Ensuring diverse education offers for various target groups about circularity of textiles is addressed through supporting *(G04) tool & skill share* in spaces for *(G05) collective looping* in neighbourhoods, and developing (*S18) shared hybrid testing & learning hubs* in (*S06) synergy clusters.*

8. access to amenities

Enhancing the accessibility *(S14)* of circular amenities for citizens is a key strategy of this project, addressed through developing several types of spatial strategies *(S05, S20, S19)* and spatial rules *(S03, S04, S09, G01)* as part of a *(S02) multi-scalar textile looping infrastructure* network.

9. energy

The City Doughnut's target of a natural gas-free city is addressed by prioritising locations for developing circular textile hubs that are *(S08) linked to zero-emission transport routes* regionally and locally following.

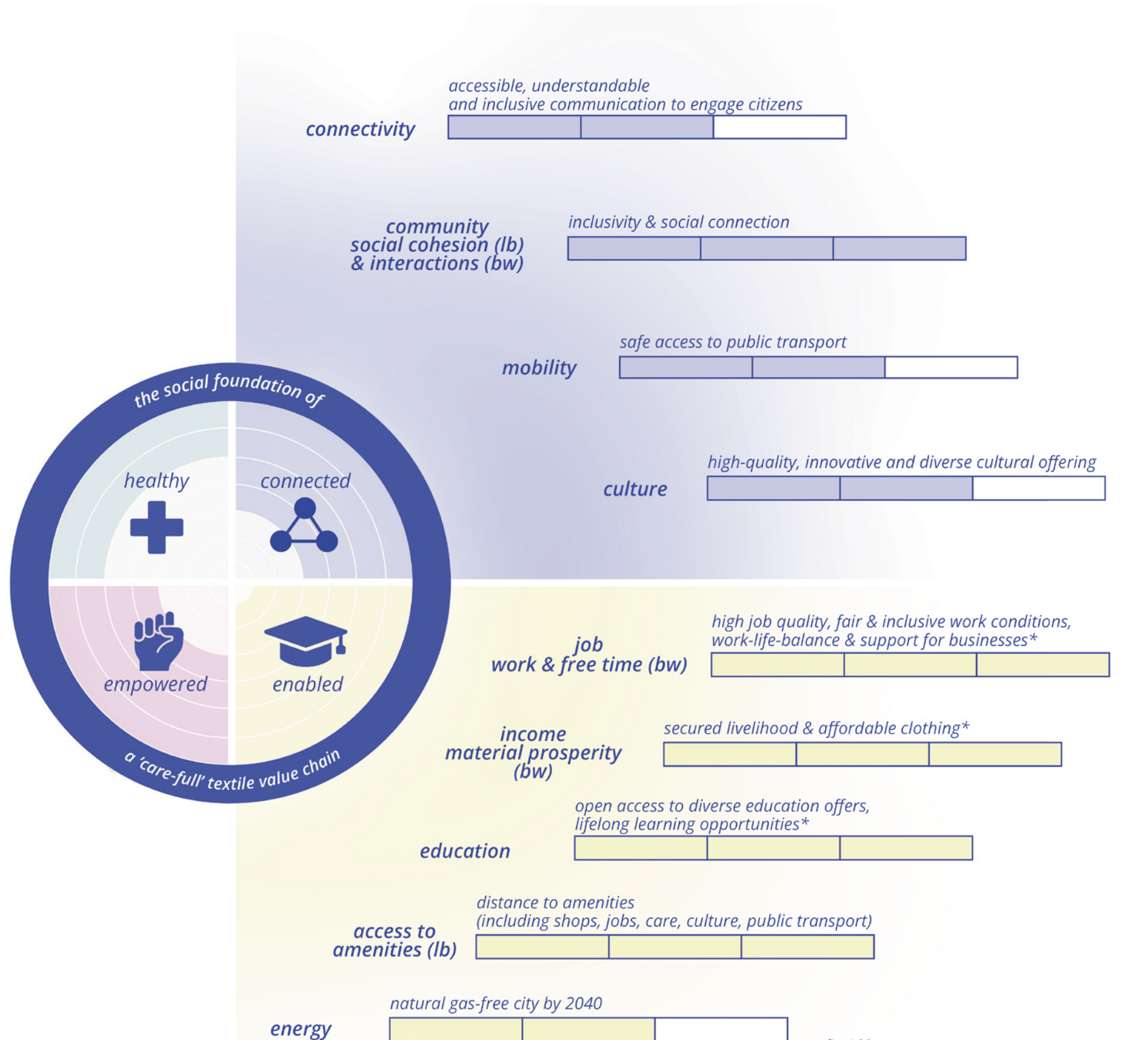


fig. 166
The social foundation evaluation
source // author, adapted from Raworth et al., 2020

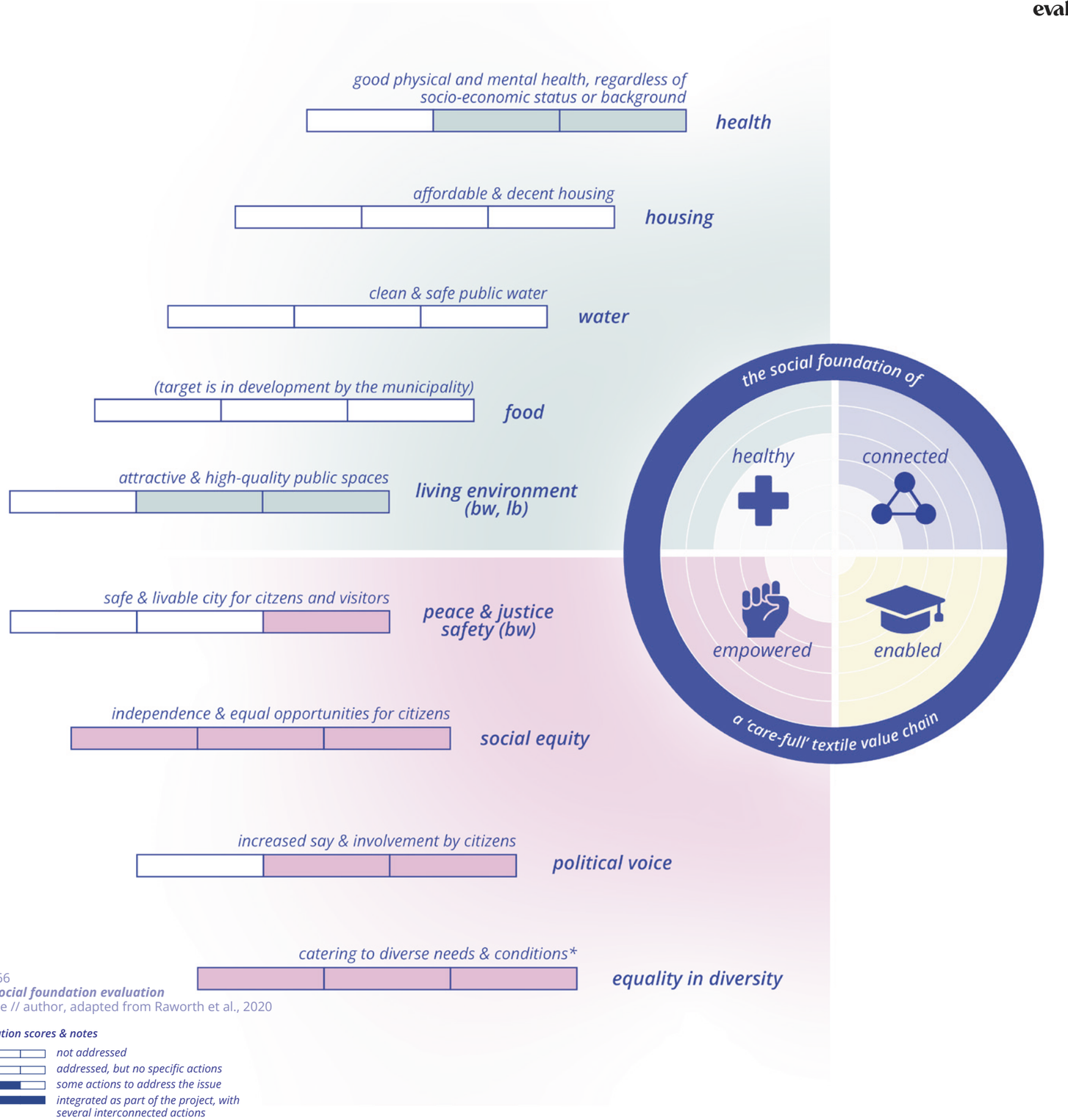


fig. 166
The social foundation evaluation
source // author, adapted from Raworth et al., 2020

evaluation scores & notes

- *not addressed*
- *addressed, but no specific actions*
- *some actions to address the issue*
- *integrated as part of the project, with several interconnected actions*

* *target is based on the Amsterdam City Doughnut's target, but expanded to fit the ‚care-full' approach*

how socially just is a ‚care-full' textile value chain?

evaluation of the social foundation dimensions of the textile Doughnut

The third and fourth key dimension addressed are the extent to which the proposed 'care-full' textile value chain enhances overall health of citizens and empowers them:

10. health

Citizen's physical health is supported by enhancing regional and local air quality through prioritising *(S08) zero-emission transport* for textile circulation. Mental health is partly and indirectly influenced through facilitating spaces and conditions for *(G05) collective looping*, which potentially fosters social cohesion and decreases the feeling of loneliness.

11. housing

Housing-related aspects were not addressed in this thesis, as no direct connection to the textile value chain could be identified.

12. water

Water-related aspects were not addressed in this thesis, as no direct connection to the textile value chain could be identified.

13. food

Food-related aspects were not addressed in this thesis, as no direct connection to the textile value chain could be identified.

14. living environment

Creating attractive and high-quality public spaces is an integrated part of the spatial strategy for a ‚care-full' textile value chain. In order to allocate spaces for textile looping, the strategy of *(S04) activating neglected common spaces* aims to create new public spaces that have a *(S11) quality of stay* for citizens. This includes providing *S19 block wardrobes* in underused courtyards and *S20 share & care cafés* in neglected public squares.

15. peace & safety

The overarching aim of a 'care-full' textile transition is to safeguard both society and the environment, indirectly contributing to a safe and livable city for citizens and visitors. However, peace and safety were not explicitly addressed through targeted actions in this thesis.

16. social equity

The 'care-full' circular approach recognises both the essential role of carers in the textile transition and the diverse realities within communities, aiming for a socially just transition. This thesis proposes a set of interrelated measures to support this ambition. Circular policies must address existing inequalities faced by circular workers by ensuring *(P08) fair working conditions*. Furthermore, enabling *(P14) alternative income sources*, promoting *(P09) tailor homes*, and creating spaces for *(G04) skill and tool sharing* can empower socio-economically disadvantaged groups - such as residents in Nieuw-West - by fostering local capacity building and social inclusion.

17. political voice

By proposing (G05) collective looping as a central strategy to drive circular textile practices, and by outlining spatial strategies (S03 & S04) to support it, this thesis aims to facilitate infrastructures that can be appropriated and activated bottom-up by local communities, thereby increasing citizen involvement.

18. equality in diversity

One central aspect of the ‚care-full' approach is acknowledging and caring for differences within communities. Accordingly, this project proposes *(P13) diverse circular strategies* that are responsive to local spatial and socio-economic conditions and shortcomings. These include promoting *(P15) affordability*, enabling *(G01) re-pair* in dense urban areas, and creating *(S12) flexible spaces* adaptable to varying community needs.

the ‚care-full' r-ladder
for staying below the ecological ceiling

Figure 167 shows how the ‚care-full' strategies are ranked in the original r-ladder, which defines a hierarchy of strategies with higher or lower circularity and ecological impact. It becomes apparent that the ‚care-full' strategies proposed in this thesis focus more on higher-level ‚r's' that narrow the textile loop, such as rethinking, reducing, and slowing down the loop through reuse, repair, remanufacturing and repurposing.

Although this thesis focused on ways to strengthen the social foundation through circularity, circular practices can have significant direct and indirect effects on the ecological impact targets of the textile Doughnut of Amsterdam as highlighted through the markers *1-9 in both figures 167 and 168.

The highest r-strategy, regeneration, was added to the official ladder, set out by the Dutch government, and aims to go beyond textile circularity by actively restoring the natural ecosystem.

*1 Strategically cultivating textile crops, such as hemp, on heavy-metal polluted grounds directly cleans up chemical pollution.

*2 Collectively looping textiles rethinks the current technocentric approach to circularity and connects citizens. (social foundation)

*3 Re-evaluating circular work by enhancing work conditions and education offers enables citizens to secure their income and balancing work and life in a better way. (social foundation)

*4 Employing a long-term cost-benefit horizon in decision-making for investments in the textile transition can potentially influence all targets of the Doughnut.

*5 Reducing textile consumption through providing convenient access to reuse, repair, and re-making options for textiles and regionalizing recycling directly reduces the generation of textile waste and thereby prevents its incineration, which improves local air quality.

*6 Reducing CO2 emissions by enabling zero-emission textile transportation and shortening the distances of looping activities enhances local air quality.

*7 The co-location of circular functions, as well as repurposing of existing structures, stops ‚new' land from being urbanised.

*8 Finally, the repurposing of agricultural residues for the bio-regional production of textiles reduces waste generation.

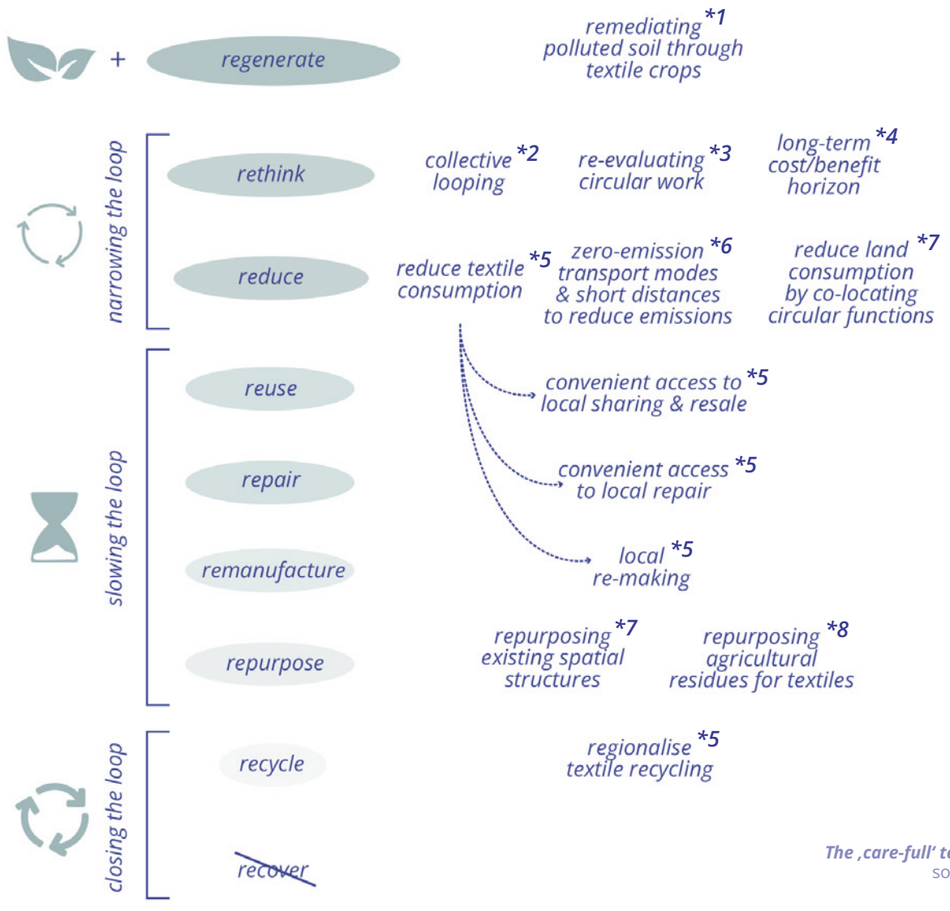


fig. 167
The ‚care-full' textile r-ladder
source // author

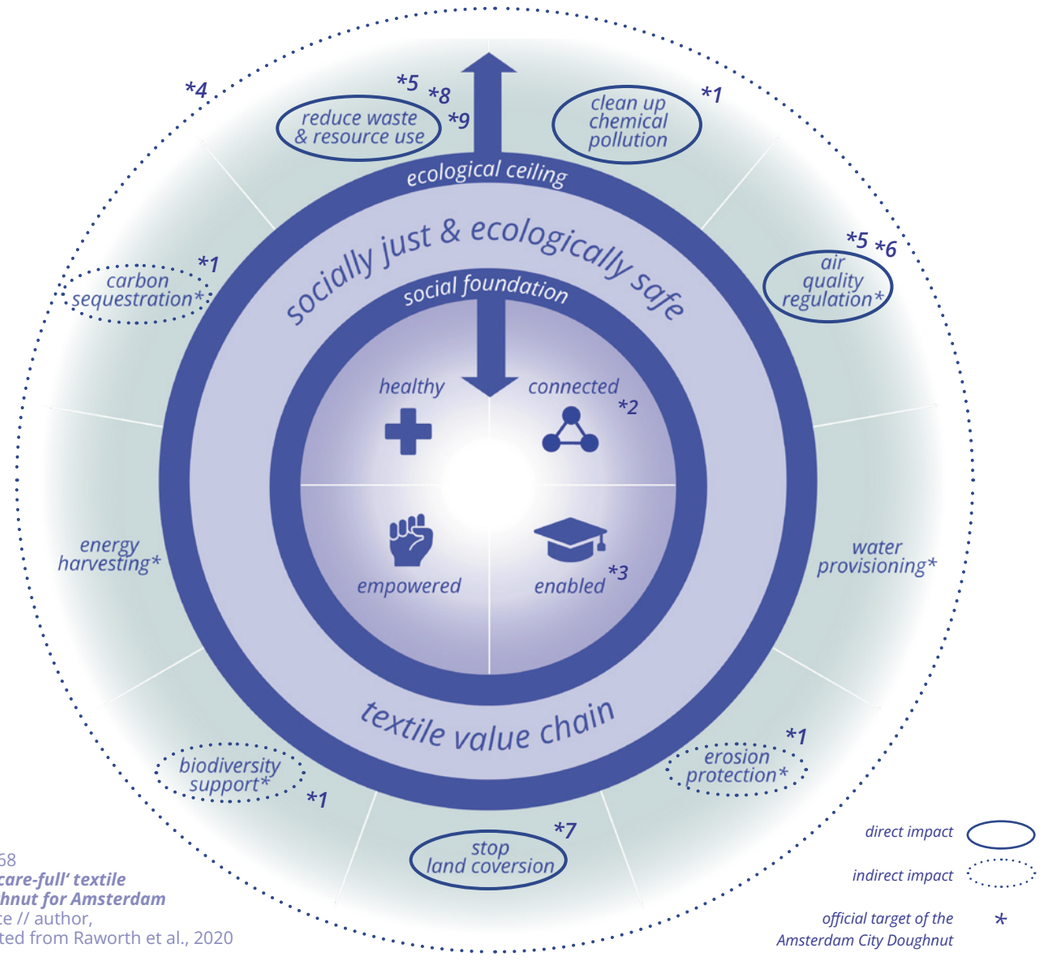


fig. 168
The ‚care-full' textile Doughnut for Amsterdam
source // author,
adapted from Raworth et al., 2020

conclusion

VIII

towards more care
in the circular textile transition in the MRA

main research question:
how can spatial planning contribute to a ‚care-full' circular transition of the textile value chain in the Metropolitan Region of Amsterdam?

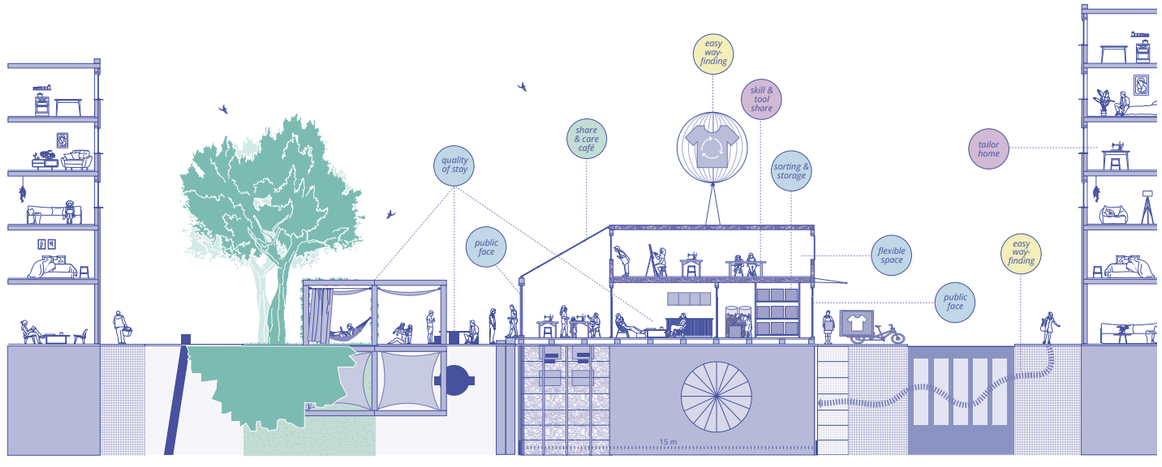
The transition to a circular textile value chain in the Amsterdam Metropolitan Region is politically driven by broader ambitions of circularity, social justice and environmental sustainability, as formulated in the Amsterdam Doughnut Economy framework.
This thesis argues that spatial planning can play a transformative role in operationalising these goals by adopting a ‚care-full' approach - a planning paradigm that takes into account material flows, spatial equity and community well-being.
A circular transition in textiles requires systemic change. It involves complex material flows (e.g. production, logistics, processing, retail and reuse), diverse stakeholder demands and spatial implications that are often overlooked in policy and planning.
Through this research, I demonstrate how spatial planning can ‚spatialise' the transition to circular textiles by aligning strategic land use and programming with broader environmental and social goals.

This ‚care-full' approach to spatial planning is guided by four interrelated dimensions:

- ***caring for materials:*** The strategy goes beyond closing textile loops. It envisions spatial interventions that combine material reuse and processing with social functions - such as craft, education and repair - to enhance the socio-ecological value of urban areas.
- ***caring for space:*** by identifying existing and underutilised spatial structures such as urban voids, commercial buildings, and infrastructure used by the linear economy, the approach repurposes them for circular activities-from local collective repair hubs to regional sorting and processing centres - creating a network of spatialised circularity. Importantly, the design of these spaces prioritises spatial quality such as visibility and legibility to the public. Interventions focus on ensuring a high quality of stay and maintaining programmatic flexibility to adapt to changing community needs and circular processes over time. In doing so, circular infrastructures are not isolated technical facilities but become valued, active, and inclusive parts of everyday urban life.
- ***caring for time:*** infrastructure and services are designed to be accessible and timely, allowing for zero-emission and short-distance transport routes while accommodating the needs of different communities.
- ***caring for carers:*** this approach prioritises the human dimension of the circular textile transition by democratising access to skill and knowledge development and exchange.
- ***caring for difference in communities:*** circular infrastructures should not only serve environmental goals but also function as inclusive spaces for community building, intergenerational exchange, and capacity building. By integrating opportunities for collective activities for textile repair, re-making, and sharing, this strategy can foster stronger local social cohesion and improve urban livability, particularly in vulnerable or neglected areas.

In conclusion, this thesis positions spatial planning as a strategic tool for guiding a care-full circular transition of the textile value chain in the Metropolitan Region of Amsterdam. By aligning material flows with spatial strategies and community needs, the proposed approach goes beyond technical circularity to embed care as a guiding principle.

fig. 169 ***Section of collective looping hub in Osdorp Midden***
source // author



focus a: understanding the current system - identifying ‚care-less' structures

What are the spatial and socio-ecological dimensions of existing ‚care-less' (Bono et al., 2024) circular practices in the textile value chain taking place in the MRA?

The aim of this analysis was to identify the shortcomings of current spatial and socio-ecological structures within the regional textile value chain, specifically through the lens of the five aspects of the ‚care-fullness' approach to circularity: carers, materials, space and time, and difference.

carers
Circular practices such as repair, resale, rental, and recycling generally generate low-quality jobs, often characterised by minimum wages, temporary contracts, and part-time work models. More vulnerable population groups tend to occupy the most informal and lowest-paid positions within this sector. In the Netherlands, trademark resale outlets (such as Kringloop) and repair cafés rely heavily on unpaid volunteers, further highlighting the low social status associated with circular jobs.

materials
The use of recycled fibers in new clothing remains minimal, despite the fact that fiber and garment production account for the majority of environmental impacts in the sector. High levels of household consumption and returns contribute to increased textile waste. Although the resale market is emerging, it remains marginal. Most textile waste ends up in residual waste streams, which are either incinerated or downcycled, even though Dutch sorting capacity is not fully utilised and greater material value could be retained through reuse and recycling. Additionally, both chemical and mechanical recycling processes require extra resources such as energy, water, or chemicals. By contrast, repair activities help to reduce both consumption and the environmental footprint of garments.

space & time
Amsterdam's widespread network of retail spaces ensures high communal access to consumption-oriented market spaces. However, there is limited communal access to circular-market spaces, such as tailoring services or second-hand stores. Access to circular non-market spaces, like repair cafés, is even more restricted - these are typically open for only two hours per month, and rarely wo hours per week. The lack of textile containers in the city center further encourages residents to discard textiles as residual waste.

difference
Vulnerable residential groups, including low-income households and individuals experiencing loneliness, have particularly limited access to non-market social repair cafés or circular-market options.

In conclusion, these findings indicate that the spatial patterns of textile consumption, circulation, and end-of-life management in the Metropolitan Region of Amsterdam are primarily shaped by profit-driven and market-oriented logic, rather than by principles of care, inclusivity, or environmental stewardship.

Where are gaps in the policy and stakeholder system from the lens of a ‚care-full' circular transition?

The goal of this analysis was to identify gaps in current local and regional policies that influence the textile value chain in the Metropolitan Region of Amsterdam, specifically in relation to the five aspects of care.

carers
Most policies fail to define concrete actions for ensuring job quality, promoting a diversity of jobs, and guaranteeing equal access to employment within the circular economy. Although the Environmental Vision Amsterdam 2050 (Gemeente Amsterdam, Ruimte en Duurzaamheid, 2021) addresses the overall well-being of workers, it does so through a broad set of interrelated actions rather than targeted measures for the circular sector.

materials
General circular economy policies (Gemeente Amsterdam, 2020) prioritise higher R-strategies, such as reuse and reduction. However, the specific policy for circular textiles in the MRA (Amsterdam Economic Board, 2022) mainly focuses on the lower R-strategy of recycling. Across the board, policies lack clear definitions and actions concerning the social function of circular spaces.

space
There is a widespread absence of detailed definitions regarding the spatial qualities and typologies necessary for circular activities. While the Environmental Vision Amsterdam 2050 does identify broad locations for circular practices (such as ports, neighborhoods, and urban centers), it does not specify the types of spaces or their required characteristics.

time
Although policies aim to improve accessibility to circular services, they generally lack clarity on what accessibility means in practice and do not outline specific actions to achieve it.

difference
While the potential for circular spaces to address diverse social needs is acknowledged, there is a lack of concrete actions to realize this potential. Policies also fail to provide measures for ensuring affordable services and tend to overlook the inclusion of civil actors and stakeholders in collaborative networks.

Policy recommendations based on the results of design experimentations are presented on pages 248-249.

What are existing ‚care-full' (Bono et al., 2024) circular practices that can inspire a ‚care-full' circular textile value chain?

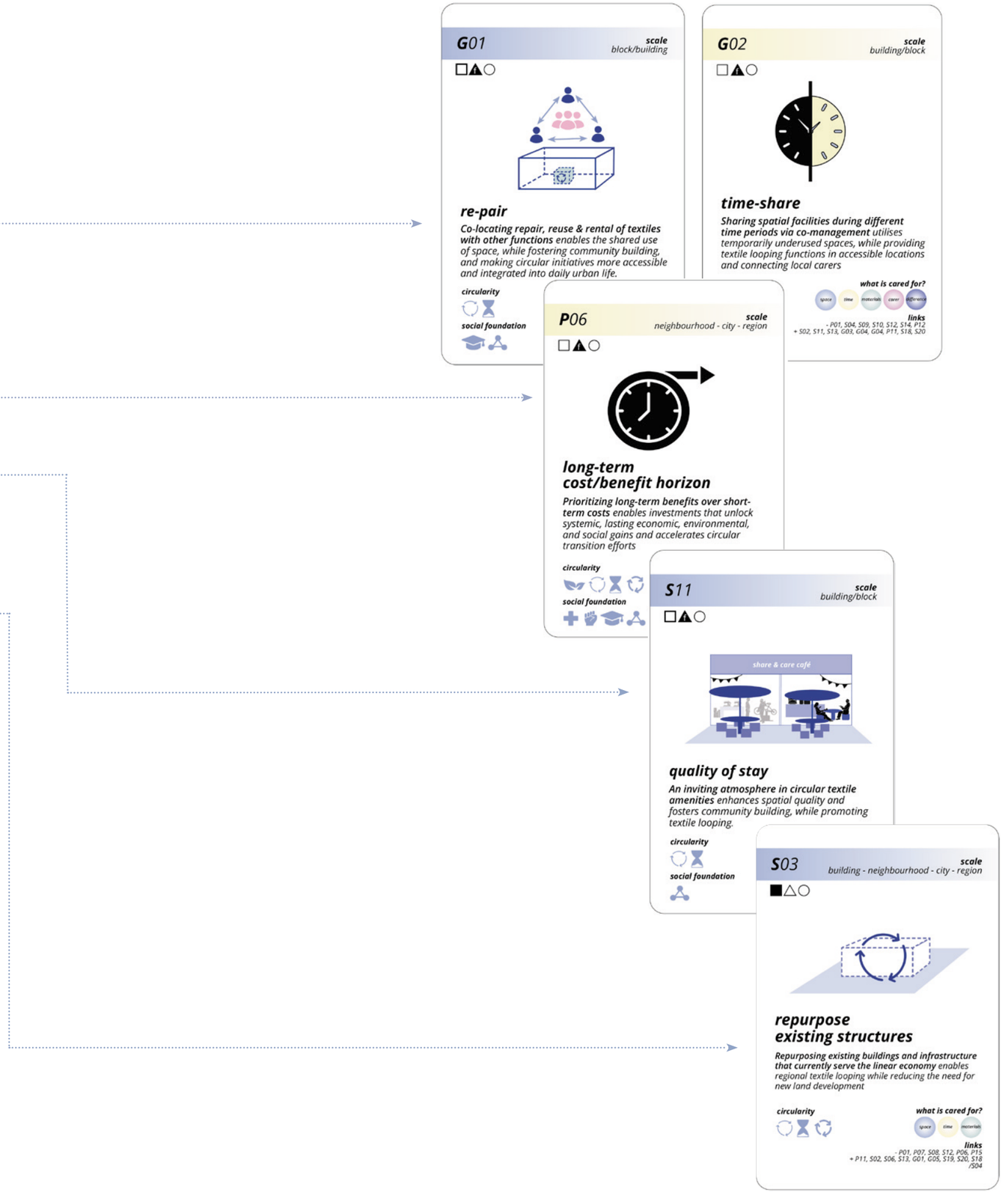
The goal was to learn from existing local initiatives to inform spatial and socio-ecological strategies to foster a ‚care-full' circular textile transition for the specific context of the MRA.

Existing 'care-full' circular practices demonstrate that combining diverse functions - such as recycling, resale, repair, and education - within hybrid community spaces can create vibrant hubs for circular activity and social connection. These initiatives, like circular craft centers and repair cafés, show that traditional ways of caring for materials can foster strong community bonds and promote sustainable consumption habits.

Supporting bottom-up, grassroots initiatives, that combine social and ecological functions, with financial resources and secured spaces is essential. They are ideally located in the heart of neighbourhoods, near points of interest. This maximises visibility, citizen engagement, and their overall impact. Well-designed and inviting community spaces encourage inclusivity and a sense of belonging, thereby strengthening local communities.

The United Repair Centre exemplifies a 'care-full' approach at a larger scale by offering professional repair services under fair working conditions, employing a diverse workforce, and integration into the urban fabric through adaptive reuse of existing buildings.

These practices illustrate how the circular textile value chain can move beyond market-driven logic to prioritise care for spaces, people, materials, and communities.



focus b: learning from existing ‚care-full' & ‚care-less' circular structures

What are spatial and socio-ecological strategies for a ‚care-full' circular textile value chain?

This research focus aimed to synthesise findings from the analysis into actionable design strategies addressing spatial design, governance, and policy, ultimately codified into a pattern language to guide a socially and ecologically equitable circular textile transition. Below are the guiding strategies organised by key aspects of care:

carers

- ***valuing carers***: ensuring dignified work conditions, fair wages, and benefits such as healthcare, training for paid workers, while recognising and rewarding volunteers through non-monetary incentives such as skill-building, community recognition.
- ***raising awareness***: promoting the social value of circular jobs through public campaigns, educational programs, and partnerships with local institutions to elevate the status of these jobs.

materials

- ***collectivising circular activities***: creating shared hubs for sorting, repair, and re-making to maximise resource efficiency, while fostering social cohesion and collaboration among businesses, communities, and municipal actors.
- ***prioritising higher r-strategies***: shifting the focus from recycling to reuse, repair, and re-making by incentivising design for durability and repairability.

space

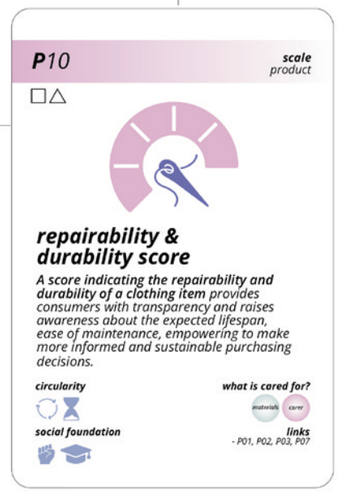
- ***closing textile loops regionally***: developing a multi-scalar looping system that connects local share & care cafés, neighbourhood collection points, and regional processing hubs to keep textiles circulating within the region.
- ***defining spatial qualities***: designing circular spaces with features like visibility through transparent façades, standardised signage, convenient accessibility through walkability and strategic location, and flexibility through modular interiors and exteriors to ensure inclusivity and adaptability.

time

- ***shortening distances***: locating circular activities within walkable/cyclable distances (e.g., 5-minute circular neighbourhoods and 15-minute circular city) to reduce transport emissions and increase participation.
- ***extending textile lifespan***: supporting repair services, rental models, and educational workshops to delay textile disposal.
- ***convenient schedules***: ensuring circular services are available at flexible hours and co-located with other amenities such as markets, public transport hubs.

difference

- ***ensuring diverse jobs***: creating spaces for formal and informal skill development and sharing to serve to diverse skill levels and backgrounds, ensuring inclusivity across age, gender, and socio-economic status.
- ***context-specific strategies***: adapting circular initiatives to local spatial and socio-economic conditions - e.g., integrating educational functions and affordable sharing options in low-income neighbourhoods or co-locating circular functions in highly dense neighbourhoods.



the role of spatial design
in a ‚care-full' circular textile transition in the MRA

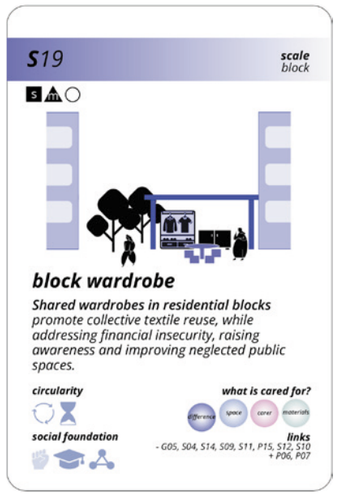
focus c: ‚care-full' spatial implementation

How can ‚care-full' circular practices be spatially facilitated in the Metropolitan Region Amsterdam?

In this thesis, spatial design has been used as a strategic tool to explore how abstract policy ambitions - particularly those related to a circular textile transition - can be grounded in concrete spatial interventions. Through the development and testing of spatial patterns, this exploration proposes key strategic spaces and spatial qualities that support socially just and ecologically sound practices. This concluding chapter synthesises the insights gained, highlighting how design can operationalise policy through place-specific and inclusive spatial strategies.

In correspondance with current** policy ambitions **the following pages propose spatial typologies (1.1-1.9) with strategic spaces and qualities for promoting circular textile practices.

***The Implementation Agenda for a Circular Amsterdam 2023-2026** aims to provide 'suitable' spaces for reuse, repair, resale and rental.*
***The Amsterdam Circular Strategy 2020-2025 and the MRA Circular Textile Roadmap** state the ambition to invest in spatial infrastructures for repair to achieve good accessibility of sharing and repair.*
***Environmental Vision Amsterdam 2050** aims for the development of productive neighbourhoods, and creation of space for experimental and democratic co-creation.*



1.1. block wardrobes

= dedicated spaces - either as standalone installations or seamlessly integrated into residential buildings - designed for the collective sharing, exchange, and repair of reusable clothing among residents, fostering a culture of sustainability and community by making it easy for neighbours to circulate clothes.

strategic location

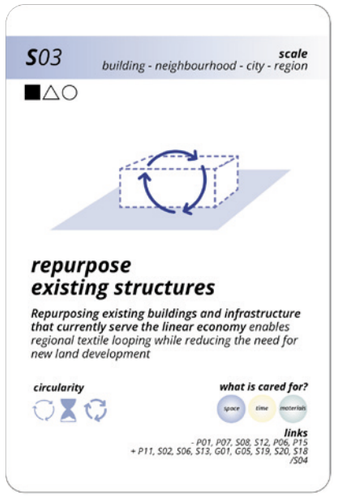
- situated in shared private or semi-private areas within residential blocks, such as lobbies, entrance halls, or communal corridors, ensuring convenient and secure access for residents.

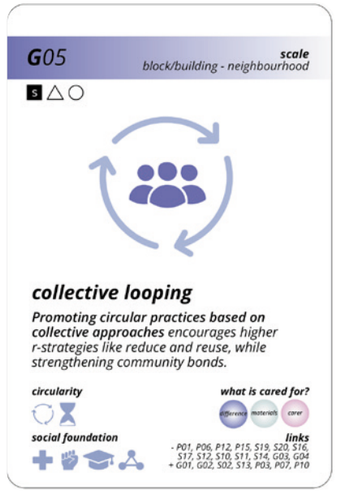
space potential

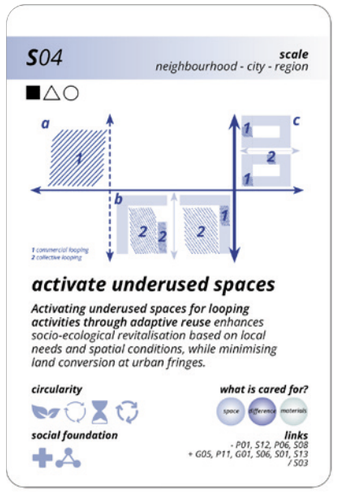
- activate neglected courtyards: Transform underused outdoor areas into vibrant hubs for clothing exchange, equipped with weather-protected wardrobes and seating.
- repurpose existing infrastructure: Convert parking garages, storage rooms, or entrance halls into inviting spaces for garment sharing, display, and repair activities.

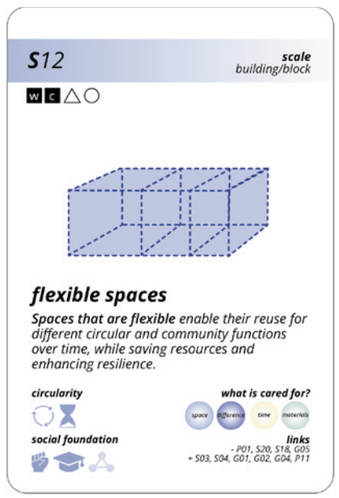
spatial qualities

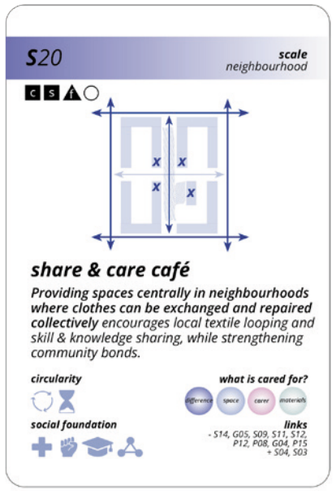
- ***accessibility:*** located within a short walking distance from all apartments in the block, ensuring effortless participation for residents of all ages and abilities.
- ***visibility:*** clear, attractive signage provides instructions for use, rules for garment exchange, and information about upcoming events or repair workshops. Transparent or partially open wardrobes invite curiosity and engagement.
- ***flexibility:*** features demountable and modular structures that can be easily relocated, expanded, or reconfigured based on changing needs or seasonal fluctuations in clothing donations and exchanges.
- ***quality of stay:*** outfitted with comfortable furniture - such as benches, chairs, and tables - that encourage residents to linger and socialise.
- ***inclusiveness:*** ground-floor access and barrier-free design ensure that the wardrobes are usable by everyone, including people with disabilities. Wardrobe heights and shelving are adjustable to accommodate all users.











1.2. Share & care café

= a vibrant, community-oriented space - either as a solitaire building or seamlessly integrated within existing neighborhood amenities - dedicated to collective repair, creative re-making, hands-on workshops, textile libraries, and local collection and sorting of textiles, fostering a local culture of sharing and social connection.

strategic location

- situated at the heart of the neighborhood, ensuring high visibility and accessibility.
- Ideally positioned adjacent to local points of interest such as neighborhood squares, sports fields, weekly markets, playgrounds, or other community gathering spots to maximize foot traffic and engagement.

space potential

- activate underused spaces: Transform neglected rooms in communal buildings, neglected courtyards, or underutilised corners of residential complexes into lively, productive hubs.
- repurpose existing infrastructure: Convert parking garages or storage areas.

spatial qualities

- ***accessibility:*** easily reachable on foot or by bike within a 5-minute radius from surrounding residential areas, making participation convenient and time-efficient for all age groups.
- ***visibility:*** features a semi-public façade with large transparent windows to showcase ongoing activities, welcoming signage to attract passers-by, and highlighted pathways or ground markings to guide visitors to the entrance.
- ***flexibility:*** interiors designed for adaptability, with movable walls and furniture to support a variety of uses—from repair workshops and upcycling events to social gatherings and educational sessions. The building structure itself is demountable, allowing for future reconfiguration or relocation as community needs evolve.
- ***quality of stay:*** both indoor and outdoor areas are equipped with comfortable, inviting furniture that encourages lingering and social interaction. Outdoor spaces feature durable, immobile benches and tables, while indoor areas offer movable seating and workstations. An integrated kitchen or bar provides refreshments and supports communal dining or coffee breaks, enhancing the café atmosphere.
- ***inclusiveness:*** ground-floor access ensures ease of entry for everyone, including those with mobility challenges. The design incorporates barrier-free pathways and inclusive workstations with adjustable heights and accessible tools, fostering participation from all community members.
- ***co-location (re-pair) potential:*** can be co-located within or adjacent to existing community centers, libraries, or schools, leveraging established networks and amenities to broaden its reach and impact.

1.3. awareness bins

= interactive collection points designed to promote awareness about textile circularity and sustainable disposal habits

strategic location

- placed near by existing waste disposal containers to enhance convenient access.

space potential

- activate underused micro-spaces such as corners of parking lots, edges of playgrounds, or transitional areas near building entrances.
- repurpose small patches of neglected land or paved surfaces that are unsuitable for other uses, turning them into visible hubs for community engagement.
- integrate with community amenities such as bike racks, bulletin boards, or parcel lockers to leverage foot traffic and maximize impact.

spatial qualities

- ***accessibility:*** walkable access within 5 minutes of residential blocks in a neighbourhood.
- ***visibility:*** signage provides clear instructions for use, educational information about textile separation, and real-time feedback (e.g., fill levels, community statistics).
- ***flexibility:*** demountable and modular bin structures allow for easy relocation, expansion, or adaptation to different waste streams as community needs evolve.
- ***quality of stay:*** clean, and odor-controlled; integrated seating or greenery to make the area inviting and pleasant for short visits and interaction.
- ***inclusiveness:*** ground-floor access, barrier-free design for people with disabilities, user-friendly interfaces (e.g., color coding, tactile elements), and multi-language instructions.

1.4. home tailors

= small-scale, local tailoring and clothing repair services operated within residential settings, contributing to reducing textile waste by providing convenient, personalised clothing care close to where people live.

strategic location

- located near drop & collect stations to facilitate easy access for customers to leave and pick up garments for repair or alteration.

space potential

- operate within residential apartments or small home studios, utilizing spare rooms or dedicated workspaces.
- can be integrated into existing community hubs or shared spaces in residential buildings to increase visibility and accessibility.
- potential to activate underused residential spaces while fostering local skill development and community engagement.

spatial qualities

- ***accessibility:*** easy access linked to drop & collect stations, ensuring seamless clothing exchange and minimising travel for users and tailors.
- ***visibility:*** discreet but identifiable within residential areas, potentially supported by signage or digital platforms connecting tailors with local clients.
- ***flexibility:*** adaptable workspaces that can accommodate various tailoring tasks, from simple repairs to more complex alterations or re-making projects.

Environmental Vision Amsterdam 2050 aims to preserve productive activity in the city, and promoting business opportunities in vibrant urban centres

1.5. circular textile retail & services

= commercial units with prominent, transparent storefronts located in urban centers, dedicated to the resale, repair, and rental of clothing and textiles, serving as accessible entry points for the public to engage in sustainable fashion practices, offering high-visibility hubs for circular textile activities and fostering a culture of reuse, repair, and responsible consumption.

strategic location

- positioned along main streets in vibrant, mixed-use neighbourhoods to maximise exposure and foot traffic.
- ideally located near complementary businesses, public transport stops, and community hubs to encourage spontaneous visits and integrated errands.

space potential

- co-location: Integrate within existing retail units to revitalise underused commercial spaces and create synergies with other local businesses and functions.
- repurpose: Transform former linear textile shops

spatial qualities

- ***accessibility:*** centrally located with easy, walkable access for residents, workers, and visitors.
- ***visibility:*** features standardised façade transparency and signage to to enhance street presence and make circular textile options easily recognisable for passers-by.
- ***flexibility:*** interiors are designed to be adaptable, with movable walls and modular furniture to support a range of uses - from retail and repair workshops to community events and educational sessions.
- ***quality of stay:*** optionally outfitted with comfortable, optional furniture such as benches, chairs, and tables to encourage customers to linger, interact, and participate in workshops or swap events.
- ***inclusiveness:*** ground-floor access and barrier-free design ensure that everyone, including people with disabilities, can easily enter and use the space.
- ***co-location (re-pair) possible:*** can be co-located with existing public or commercial amenities, such as libraries, community centers, or multi-brand retail complexes, to leverage established foot traffic and foster cross-sector collaboration.amenities.

1.6. drop & collect stations

= temporary storage units to drop off and collect repairable/repaired clothes, linking (home) tailors with clients.

strategic location

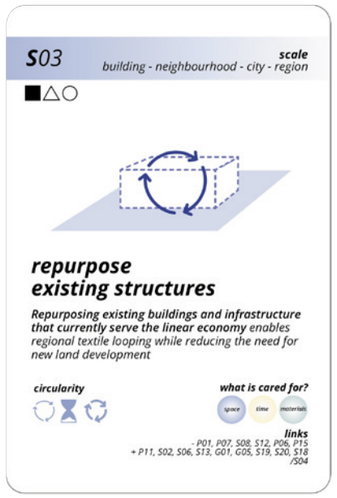
- Located in public waiting areas at transport hubs.

space potential

- Integrated into bus or tram stop shelters.

spatial qualities

- ***accessibility:*** Directly linked to public transport for convenient accessibility and zero-emission transportation.
- ***visibility:*** Clear signage with usage instructions and a map of local circular textile options.
- ***flexibility:*** Demountable structures for easy relocation or scaling.
- ***quality of stay:*** Includes benches or seating to encourage brief interaction and comfort.
- ***inclusiveness:*** Ground-floor, barrier-free access for all users.



1.7. urban light manufacturing hubs

= edicated urban sites for sorting, temporary storage, repair, and re-making of clothing using regionally recycled and bio-based fabrics, supporting local circular textile flows.

strategic location

- situated in urban industrial, commercial, or retail zones for optimal logistics and accessibility.

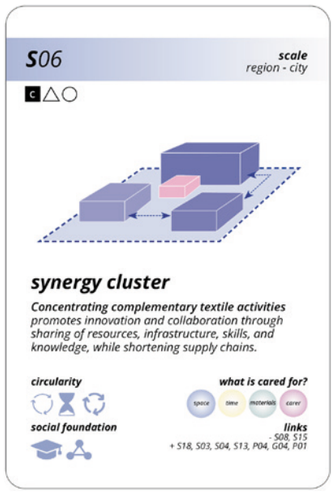
space potential

- repurpose large, underused structures such as shopping malls or parking garages to accommodate equipment and workflows.

spatial qualities

- ***accessibility:*** well-connected to urban railway networks for cargotram distribution and local roads for cargo-bike transport.
- ***visibility:*** standardised transparent façades and clear signage enhance recognition and guide users to circular textile services.
- ***quality of stay:*** offers an open-access indoor area (at least 50 sqm) next to crafting spaces, furnished with benches, chairs, and tables to foster collaboration and community.
- ***flexibility:*** interiors for open-access area are partly adaptable, with movable walls and furniture to support various uses, including repair and re-make workshops.
- ***inclusiveness:*** ground-floor, barrier-free access and adjustable workstations ensure usability for all.

Environmental Vision Amsterdam 2050 aims to support a circular economy hub in the port area
MRA Circular Textile Roadmap aims at 100% textile circularity within the region
The Circular Strategy 2020-2025 states the ambition to invest in spatial infrastructures for cooperation across sectors



1.8. circular textile clusters

= large-scale industrial sites dedicated to textile sorting, processing, and low-emission logistics, supporting regional textile looping.

strategic location

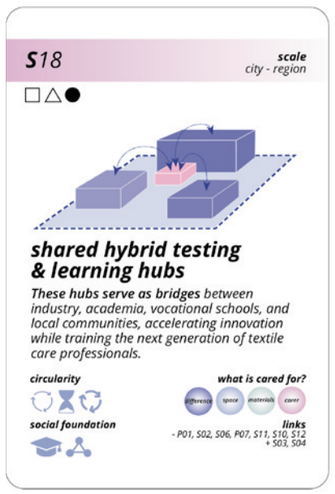
- positioned near educational institutions, textile industries, and agriculture or food processing sectors to foster resource sharing, skill development, and local ecosystem synergies while minimizing logistical emissions.

space potential

- repurpose former linear industrial sites such as warehouses, coal or oil factories.
- activate underused brownfields, drosscapes, or vacant industrial land for new circular functions.

spatial qualities

- ***accessibility:*** connected to water or rail networks for zero-emission freight movement, with public transport access for workers.
- ***flexibility:*** flexible floorplans with movable walls on rails to accommodate changing operational needs.
- ***inclusiveness:*** Ground-floor, barrier-free access and adjustable workstations for universal usability.



1.9. shared hybrid testing & learning labs

= integrated and flexible education and innovation centers for prototyping, testing, and training, collaboratively used by synergy cluster members and nearby educational institutions.

strategic location

- located within synergy clusters to foster collaboration and direct knowledge exchange.

space potential

- repurpose former industrial structures such as warehouses or coal and oil factories.
- activate underused brownfields, drosscapes, or vacant sites for new educational and innovation purposes.

spatial qualities

- ***accessibility:*** connected to water or rail networks for efficient freight movement, with public transport access for workers.
- ***visibility:*** transparent façades and prominent signage to invite participation and raise awareness of ongoing activities.
- ***flexibility:*** modular interiors and movable partitions enable quick adaptation for workshops, exhibitions, lectures, and evolving technologies.
- ***quality of stay:*** provision of amenities (rest areas, refreshments); inviting indoor and outdoor spaces for informal interaction and relaxation.
- ***inclusiveness:*** ground-floor, barrier-free access, inclusive workstations, accessible restrooms, and support for diverse user needs.

Overall, the goal was to explore how the developed ‚care-full' design strategies can be implemented into the existing regional and urban landscape, thereby translating current circular textile policies into space.
The pattern set and network was used to design a cross-scalar spatial strategy and vision facilitating a network of multi-scalar textile looping infrastructure to close textile loops within the region.
Spatial potentials at the regional, city, district quarter, neighbourhood and block level were identified and how they would be transformed by ‚carefull' intervention was shown through sections and maps.
At the smallest scale, a district quarter with a vulnerable population was chosen because of the potential of the ‚care-full' approach to improve the overall quality of life through community building and improving the living environment by enhancing public spaces. As a result, the spatial strategy is able to provide convenient access to collective looping practices within a 5-minute walk, by implementing share & care cafés as plug-ins to underused common spaces in the heart of a neighbourhood, and block wardrobes in the courtyards of residential blocks.
These measures aim to slow down the turnover of clothing consumption while strengthening community cohesion.
The city-scale ‚care-full' textile system supports the collective loop by, on the one hand, processing surplus clothing through a multiscale sorting and storage network facilitated by repurposing existing structures such as shopping malls, parking garages and warehouses in retail, commercial, and industrial areas, and, on the other hand, providing local re-make, repair and resale services for clothing collected from neighbourhoods within a 15-minute cargo-bike radius spatially connected to these facilities.
The regional system is designed to build on existing textile activities and knowledge, forming synergistic clusters for recycling, remanufacturing and bio-based production to support the local loop within a 30-minute freight train distance.

policy recommendations

IX

policy recommendations
towards more care in the circular textile transition

The following general policy recommendations align with the research of this project that highlight how circular practices can foster place-based social capital and community resilience. By embedding 'care-full' textile practices into public, private and shared spaces, circularity becomes a socially enriching urban norm rather than an individual responsibility.

care for materials

1. by prioritising higher r-strategies, such as regenerating, reducing, reusing and repairing, continuously across policy documents with defining specific actions

actions:
- *develop incentives for soil repair through textile crops*
- *provide spaces for looping activities (refer to next point)*
- *regulation for a durability/repairability score, provision of spare parts (buttons, zippers, patches etc.), and bio-based and pure materials in clothing*

2. leverage the potential of collective looping practices (refer to points 3. & 4.)

care for space

3. by defining spaces and functions for circular textile activities across scales and strategies on how to make them available for circularity

- ***national scale:*** *explore sourcing potentials of bio-based fibres for local textile production.*
- ***regional scale:*** *sorting and storage and recycling on industrial land to support the local city loop.*
- ***city scale:*** *sorting and temporary storage network across retail, commercial, industrial areas or connected to public transport stations.*
- ***neighbourhood scale:*** *care & share centers for collective looping in the heart of a neighbourhood (with spatial qualities of point 4.); increase amount of collection containers, locate them close to residual waste containers, and design them in an engaging way with a manual for presorting.*

strategies:
- *dismantling linear land use in commercial and industrial zones by regulating or incentivising (subsidies) to promote a switch to circular activity.*
- *governance strategies for development of underused spaces, such as communal courtyards, top-ups of low-story buildings; and for managing time-sharing of communal and commercial buildings.*
- *defining circular functions in land use plans.*

4. by defining the spatial qualities that influence the suitability of those spaces

qualities:
- *<u>adaptability of spaces</u> for flexible reuse*
- *<u>visual permeability</u> and legibility of circular functions to promote citizen to make use of them and raising awareness for processes and resources required to circulate textiles (sorting, repairing, remaking)*
- *<u>quality of stay</u> to encourage social interaction (at least for communal amenities)*

care for time

5. locate collective looping activities in close proximity to residential housing

strategies:
- *Apply time/space-relating methods from temporal and temporary urbanism to aim for convenient walking distance of 5 minutes.*

6. regard and cater to different schedules of residents to enhance accessibility of circular textile options to promote them

- *Co-locate circular functions in strategic access points of everyday life such as public transport stations, social or public facilities.*

7. aim to shorten distances of textile looping activities to reduce environmental impact by applying a multi-scale circular spatial approach (refer to point 3.)

- *Direct link to local low-emission transport options (railways for freight train and cargo-tram, bike paths for cargo-bikes, public transport for carers).*

care for carer

8. value carers

strategies:
- *set higher standards for working conditions for circular workers regarding wages, equality*
- *provide benefit models, such as discounts, to acknowledge value of volunteers*

9. raise awareness among consumers to shift them into caring

- *refer to point 4. - enhance visibility*
- *awareness campaign with neighbourhood participation game showing results on circular barometers*

care for difference

9. address struggles of vulnerable groups with social circular opportunities strategically

strategies:
- *affordability and spatial accessibility (refer to point 5.) of circular textile options*
- *alternative source of income by allowing and building infrastructure (drop & collect stations) and subsidise rent for home tailoring services*

10. ensure equal market access for circular businesses & services

- *financial support for circular textile services to boost their availability in more central expensive locations*

policy recommendations
for a ‚care-full' circular textile transition in the MRA

One of the primary aims of this thesis was to develop recommendations for current regional and local policies that address the circular transition of the textile value chain in the Metropolitan Region Amsterdam. These recommendations are framed through the lens of care (Bono et al., 2024), emphasising not only material and economic flows but also the well-being of workers, inclusivity, spatial quality, and the diverse needs of local communities. By integrating care as a guiding principle, the thesis seeks to inspire policy approaches that foster a more equitable, resilient, and socially just circular textile system for the region.
The policy analysis, conducted through the lens of care (Bono et al., 2024), revealed several significant gaps. Overall, current policies lack clear definitions and actionable steps for creating and designating spaces specifically for circular textile activities, as well as criteria for what constitutes 'suitable' spaces. The latter is addressed through the proposed 'care-full' spatial typologies on pages 280-287. Additionally, there is insufficient guidance on how to improve accessibility to circular options for all residents, and a lack of targeted support for carers - those individuals and groups who actively drive the circular transition. Finally, existing policies fall short in articulating how circularity can be integrated with efforts to strengthen local community well-being, missing opportunities to foster social cohesion and inclusivity alongside environmental goals.
The following pages will outline the identified shortcomings and corresponding recommendations for each of the five care aspects. The recommendations are directed towards the following carers and relevant authorities:

1. at the local scale, within the Municipality of Amsterdam: Directie Ruimte en Duurzaamheid (Department of Spatial Planning and Sustainability), Directie Economische Zaken (Economic Affairs Department), Directie Onderwijs, Jeugd en Zorg (Department of Education, Youth and Welfare Services), Directie Werk, Participatie en Inkomen (Work, Community Participation and Income), Community organisations and grassroots initiatives

2. at the regional scale, within the Metropolitan Region of Amsterdam: Provincie Noord-Holland & Flevoland, Amsterdam Economic Board, Amsterdam Port, Green Deal Circular Textiles, Vervoerregio

3. at the national scale, within the Dutch authorities: Nederlandse Voedsel- en Warenautoriteit (NVWA - Netherlands Food and Consumer Product Safety Authority), Ministerie van Infrastructuur en Waterstaat (Ministry of Infrastructure and Water Management) and the Stichting UPV Textiel, DGRW (Directoraat-Generaal Ruimte en Wonen), PBL (Netherlands Environmental Assessment Agency), ProRail (rail freight authority), Ministry of Economic Affairs and Climate Policy (EZK), Ministry of Agriculture, Nature and Food Quality (LNV),

care for carer

***gaps** in policy ambitions & actions*

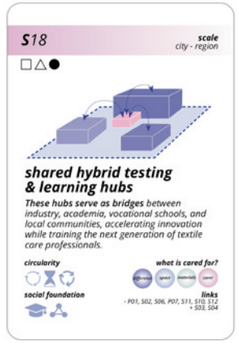
Amsterdam Circular Strategy 2020–2025	• ambition: creating opportunities for people with distance to the traditional labour market • ambition: need for specific skills and knowledge development for circular jobs
Implementation Agenda for a Circular Amsterdam 2023-2026	• ambition: need for specific skills and knowledge development for circular jobs • action: supporting circular businesses in finding workers • action: partner with retailers to raise awareness
Environmental Vision Amsterdam 2050	• ambition: improve workers overall well-being by shortening distance of working and living spaces for lower-skilled and practically skilled workers, enhance transportation, affordable housing, social facilities for recreation • action: new forms of development through investment in housing collectives and cooperatives
Retail Policy 2018-2022	• ambition: increase employment in retail
MRA Circular Textile Roadmap	• ambition: creating opportunities for people with distance to the traditional labour market
gaps & implications	***Policies lack depth in specifying ambitions and concrete actions, particularly regarding how new skills and knowledge will be fostered within the circular textile sector. Additionally, while there are general intentions to partner with retailers to raise awareness, these efforts are not anchored in specific, relevant issues facing the sector, nor do they address the unique needs of different actors. By focusing partnerships primarily on retailers, current policies overlook the critical role of repair services, such as tailors, in the circular transition. This limits the development of a more inclusive and comprehensive approach that would support skill-building, job diversity, and the visibility of all carers, not just those in retail.*** ***To be effective, policies should outline targeted measures for up-skilling, knowledge exchange, and collaboration that include the full spectrum of carers, ensuring that repair and other non-retail services are integral to awareness campaigns and capacity-building initiatives.***

In order to boost new skills and knowledge development, enhance and democratise access to innovation and education.

- at the neighborhood scale, share & care cafés should be established with adaptable spaces and mobile equipment, enabling flexible, hands-on workshops for repairing and remaking clothes. These workshops can be informally organised by local community members, while the municipality should ensure that at least one formal, public funded workshop with qualified teachers takes place each month.
- at the regional scale, collaboration between existing and emerging textile companies and nearby vocational schools should lead to the creation of shared hybrid R&D labs. These labs, integrated within new circular textile clusters combine research, development, and education, fostering innovation and practical skill-building.
- to promote inclusive employment, combined work and education programs should be offered, particularly targeting individuals without formal qualifications. Additionally, the creation of semi-public circular textile organisations can provide protected employment or supported pathways into regular work, ensuring opportunities for a diverse workforce.
- finally, asigning independent matchmakers to oversee both formal and informal skill-sharing locations - locally and regionally - will help connect carers, including teachers, employers, and workers of all skill levels.
  This approach ensures a robust, interconnected ecosystem for skill and knowledge development, supporting a more inclusive and resilient circular textile economy

addressees:

- *The Municipality of Amsterdam (Directie Ruimte en Duurzaamheid, Directie Economische Zaken, Directie Onderwijs, Jeugd en Zorg)*
- *Regional authorities and public-private partnerships (e.g., Amsterdam Economic Board, Green Deal Circular Textiles)*
- *Vocational schools, textile companies, and social enterprises*
- *Community organisations and grassroots initiatives*



In order to raise awareness and promote citizens and visitors to make use of circular textile services and functions,

improve visibility & wayfinding of circular textile options.

- this can be achieved by partnering with civic and private circular initiatives - including retailers, tailors, and repair cafés - to introduce standardised signage on shop fronts, making circular services easily recognisable throughout the city.
- additionally, mapping all circular textile options and creating dedicated circular textile routes for tourists and residents can further enhance visibility. These routes and locations should be promoted through advertisement posters at metro and tram stations and integrated into widely used platforms such as the Mijn Amsterdam app, the I amsterdam City app and a Google Maps plug-in.

addressees:

- *The Municipality of Amsterdam (Directie Ruimte en Duurzaamheid, Directie Economische Zaken)*

- introducing a durability and repairability score for textile products can also help consumers make informed choices, further promoting the use of circular services and supporting a culture of repair and reuse

addressees:

- *Netherlands Food and Consumer Product Safety Authority (Nederlandse Voedsel- en Warenautoriteit, NVWA) with the Ministry of Infrastructure and Water Management (Ministerie van Infrastructuur en Waterstaat) and the Stichting UPV Textiel*

In order to enhance work conditions, especially for lower-skilled and practically-skilled carers,

ensure short distances between working and living spaces.

- leverage the flexibility provided by the Environmental and Planning Act (Omgevingswet) to designate labour-intensive circular activities with low environmental impact - such as re-making, clothing repair, and manual assembly of recycled textiles - within existing urban industrial, commercial, and large-scale retail sites. This can be achieved by repurposing underused spaces like shopping centers and parking garages and formally incorporating these functions into the municipal environmental plan (Omgevingsplan).
- use a mix of regulatory, economic, and soft policy instruments - such as strategy setting, targets, loans, subsidies, and public procurement - to stimulate this urban manufacturing settlement pattern and create local jobs. These instruments help overcome financial barriers for circular businesses and encourage both the establishment and scaling of circular activities near residential areas, thereby improving accessibility for workers and fostering vibrant, mixed-use neighborhoods.

addressees:

- *The Municipality of Amsterdam (Directie Ruimte en Duurzaamheid, Directie Economische Zaken)*

care for materials

***gaps** in policy ambitions & actions*

Amsterdam Circular Strategy 2020–2025	• ambition: circular practices as opportunities for social synergies • ambition: reducing, repairing and reusing goods before recycling • action: producer responsibility agreements
Implementation Agenda for a Circular Amsterdam 2023-2026	• ambition: focus on reducing, repairing and reusing goods before recycling • action: maximising processing contracts for collecting textiles
Environmental Vision Amsterdam 2050	
Retail Policy 2018-2022	
MRA Circular Textile Roadmap	• ambition: focus on scaling up recycling of materials
gaps & implications	***Current policies recognise the potential for synergies between social functions and circular practices, but they fall short in specifying concrete actions to foster these connections. For example, there is no emphasis on developing non-market spaces that support social circular functions, such as community building or addressing socio-economic challenges like poverty. Instead, the policy focus remains on enhancing economically viable offers, which may not be financially accessible or socially engaging for all citizens.*** ***Additionally, the policies lack integrated actions aimed at implementing higher r-strategies for textiles - such as reducing, repair, and reuse. This undermines efforts to achieve the best environmental outcomes. The regional circular textile policy's strong emphasis on recycling risks neglecting these higher R-strategies, potentially resulting in additional resource use and less effective circularity overall.***

In order to ensure low- and zero-emission textile circularity,

1. prioritise and actively support higher r-strategies - such as repair, reuse, and reduce - through targeted actions.

- subsidise higher textile looping practices from either local, regional or national funds from the municipal Waste & Raw Materials Implementation Programme, from the financial contributions from producers for the Extended Producer Responsibility (EPR) or Green Deal Circular Textiles consortium. This can be achieved by developing and implementing a subsidy ordinance that clearly outlines the types of subsidies available, eligibility criteria, application procedures, and reporting requirements. Subsidies should be accessible to initiatives that can demonstrate their contribution to repair, reuse, or the indirect reduction of textile consumption, supported by an environmental impact assessment. This can be justified by the clear public interest in achieving sustainability and circularity goals, as higher r-strategies yield more significant positive environmental and social impacts.

addressees:

- *The Municipality of Amsterdam (Directie Ruimte en Duurzaamheid, Directie Economische Zaken)*
- *Amsterdam Economic Board*
- *Ministry of Infrastructure and Water Management (Ministerie van Infrastructuur en Waterstaat)*

2. develop circular processing clusters connected to zero-emission transport routes.

- designate and fund circular textile processing hubs in locations with existing industrial infrastructure connected to rail- and waterways (e.g., Port of Amsterdam).

addressees:

- *DGRW (Directoraat-Generaal Ruimte en Wonen), PBL (Netherlands Environmental Assessment Agency), Rijkswaterstaat (part of the Ministry of Infrastructure and Water Management) & ProRail (rail freight authority)*

3. level the playing field for bio-based textiles to repurpose agricultural residues.

- develop a national policy framework that supports biomass use for the textile sector.

addressees:

- *Ministerie van Infrastructuur en Waterstaat (Ministry of Infrastructure and Water Management), Ministerie van Landbouw, Natuur en Voedselkwaliteit (Ministry of Agriculture, Nature and Food Quality)*

In order to foster place-based social capital and strengthen community cohesion through circular textile practices,

1. establish neighbourhood-level spaces.

- designate accessible community spaces at the neighbourhood level that facilitate collective textile looping activities - such as repairing, remaking, and sharing - into the municipal environmental plan (Omgevingsplan). These spaces should be designed to support both circularity and social interaction and strategically located for convenient accessibility, as specified on pages 280-287; for further guidance on space allocation, refer to the ‚care for space' section.

2. fund inclusive and socially-engaged circular tetxile initiatives.

- allocate funding to circular textile initiatives that intentionally combine textile circularity goals with social inclusion and community building. Support should prioritise projects that:
  1. allow common access to facilities, giving people the right to stay without any obligation to consume.
  2. provide free services, such as workshops or repair sessions.
  3. offer these opportunities at least temporarily during certain times of the day or month, ensuring broad community participation.

3. promote cooperative governance models.

- encourage collective management of these spaces through innovative governance structures, including:
  1. co-management or collaborative governance, where responsibilities for operation, maintenance, and use are shared among carers, enabling the integration of circular textile functions (e.g., repair services alongside retail).
  2. commons-based governance, where spaces are managed as shared resources by the user community itself, in amenities such as the share & care cafés.
  3. public-private or civic partnerships, which foster experimentation and the integration of civic or private innovation into municipal strategies.

addressees:

- *The Municipality of Amsterdam (Directie Economische Zaken, Directie Werk, Participatie en Inkomen)*

care for space

gaps in policy ambitions & actions

Amsterdam Circular Strategy 2020–2025	• action: investments in spatial infrastructure for repair and cooperation across sectors
Implementation Agenda for a Circular Amsterdam 2023-2026	• ambition: providing 'suitable' spaces for reuse, repair, resale and rental
Environmental Vision Amsterdam 2050	ambitions: • retain business functions close to neighbourhoods • preserve productive activity in the city • enable mixed-use zoning in urban neighbourhoods • promote business opportunities in vibrant urban centres • support a circular economy hub in the port area • create space for experimental, democratic co-creation
Retail Policy 2018-2022	
MRA Circular Textile Roadmap	• ambition: 50% more repair places for clothing
gaps & implications	***Current policies lack specific details on how spatial ambitions - such as "retaining business functions near neighbourhoods" or "providing suitable spaces" - are to be integrated and what qualities these spaces should have. This absence of clear spatial strategies can result in random integration, leading to issues with visibility and wayfinding that ultimately prevent citizens from accessing circular textile options. This gap is addressed with proposing spatial typologies for tetxile circularity on pages 280-287. Moreover, without practical strategies for the provision and allocation of spaces, the realisation of these ambitions is likely to be hindered, undermining the effectiveness of circular textile policies overall.***

In order to ensure sustainable urban integration of circular textile functions - maximising their visibility, accessibility, and community engagement, supporting both environmental and social objectives,

a multi-scalar infrastructure network should be developed using targeted spatial and policy instruments. The following strategies specify how spaces for circular textile functions can be allocated in strategic locations.

1. dismantle linear land use in industrial, commercial, and retail zones.

- permit a mix of circular, commercial, and community uses in areas previously designated for single-function industrial, commercial, or retail activities.
- Implement incentive programs and conditional subsidies to encourage circular textile activities that replace linear, resource-intensive uses.

2. allocate circular functions in mixed and urban neighbourhoods.

- integrate both collective and commercial looping functions into land-use plans such as the Omgevingsplan.
- expand business categories in planning documents to define and permit specific circular functions, including collective and commercial reuse, repair, recycling, bio-based production, and educational activities.

3. activate underused spaces.

- repurpose underutilised courtyards, vacant plots, parking spots, and rooftops for permanent or flexible circular textile amenities, such as share & care cafés, mobile tailoring units, or rooftop workshops.
- introduce flexible permits, tax exemptions, and co-financing schemes to encourage circular retrofits and space sharing.

4. Enable lively centres for circular business.

- incentivise flagship circular textile enterprises - such as innovative resale stores or fibre-to-fibre studios - to establish themselves in high-visibility locations like main retail streets or cultural hubs.
- curate prominent locations for these businesses and provide support through business development services and targeted awareness campaigns.

addressees:

- *The Municipality of Amsterdam (Directie Ruimte en Duurzaamheid, Directie Economische Zaken)*
- *Amsterdam Economic Board*

care for time

gaps in policy ambitions & actions

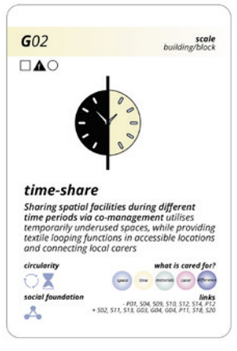
Amsterdam Circular Strategy 2020–2025	• ambition: good accessibility of sharing & repair
Implementation Agenda for a Circular Amsterdam 2023-2026	
Environmental Vision Amsterdam 2050	
Retail Policy 2018-2022	• ambition: accessibility of retail in general • action: excludes subordinate retail coupled within repair businesses from the retail clustering rule, which means they can be integrated into residential areas
MRA Circular Textile Roadmap	• ambition: good accessibility of sharing & repair
gaps & implications	***Policies in the circular textile sector frequently lack clear definitions of accessibility and omit specific actions to achieve it. This gap can undermine efforts to ensure that all citizens benefit from and participate in circular textile initiatives.***

In order to promote citizen participation and use of circular textile options,
ensure these services are conveniently and timely accessible in everyday life.

1. neighbourhood-scale accessibility.
- collective looping functions - such as share & care cafés, awareness collectors, block wardrobes - should be located within a five-minute walking radius of residential areas. This proximity ensures that participation in circular activities becomes a practical part of daily routines.
- spatial planning guidelines: integrate accessibility targets into urban planning frameworks, requiring circular amenities within set proximity to homes.
- targeted local subsidies: offer municipal grants or subsidies for neighborhood-based circular initiatives

2. co-location in dense urban quarters.
- in densely populated city areas, both collective (community-driven) and commercial (retail, repair, resale) looping functions should be co-located in accessible public or private buildings, such as community centres, libraries, or retail spaces. This approach increases the distribution and visibility of circular options within neighbourhoods.
- implement time-share models, facilitated through cooperative governance, to maximize the use of available spaces for circular textile activities. Temporary “re-pair” options should be offered regularly and at various times of the day and month to accommodate different citizen schedules.
- mixed-use permitting: update land-use regulations to allow mixed-use of public and private buildings for both community and commercial circular textile functions.
- time-share and cooperative governance models: legally enable and incentivize time-share arrangements and cooperative management for shared spaces.
- operational grants: provide operational funding for collaborative use of public buildings for circular textile activities.
- flexible permitting: introduce temporary and flexible permits for pop-up or mobile circular textile services.

addressees:
- *The Municipality of Amsterdam (Directie Ruimte en Duurzaamheid, Directie Economische Zaken)*
- *Amsterdam Economic Board*



care for difference

gaps in policy ambitions & actions

Amsterdam Circular Strategy 2020–2025	ambitions: • circular spaces as opportunities for diverse workers, for (lonely) residents to connect socially • affordable sharing & repairing services
Implementation Agenda for a Circular Amsterdam 2023-2026	• ambition: collaborative learning with entrepreneurs and social initiatives • action: facilitating textile collective of business owners
Environmental Vision Amsterdam 2050	• ambition: utilise collective knowledge and support local vision-making in city development
Retail Policy 2018-2022	
MRA Circular Textile Roadmap	• ambition: supporting & connecting creative local entrepreneurial circular textiles initiatives
gaps & implications	***While current policies recognise the opportunity to address different social needs within the circular textile sector, they lack concrete actions to translate this recognition into practice. There are no defined measures to ensure that circular textile services - such as repair, resale, and reuse - are affordable and accessible to all citizens. This risks excluding lower-income groups and undermines the social inclusion potential of circularity. Policies fail to include civil society carers into collaboration networks. Without specific actions to involve civil actors and provide affordable services, policies risk missing out on the community-building and social resilience benefits that circular textile initiatives can offer.***

In order to cater to diverse local socio-economic and spatial conditions and fostering community-building and social resilience through circular textile functions,

policies must move beyond general ambitions and adopt targeted, actionable measures. The following approaches address affordability, inclusivity, and network-building, ensuring that circular textile systems are equitable, accessible, and resilient.

1. ensure afforability.
- affordable or free services: provide subsidised or free circular textile services (repair workshops, clothing swaps) especially in neighborhoods with vulnerable populations or low socio-economic scores. This lowers financial barriers and fosters participation.
- mixed financing models: combine public funding, private investment, and social enterprise revenue streams to ensure financial sustainability and allow social enterprises to offer low-cost services.
- direct municipal grants and targeted subsidies to collective looping functions with an educational focus in areas of high social vulnerability.

2. address social cohesion and community needs.
- collective looping in low cohesion areas: prioritise the establishment of collective textile functions (such as share & care cafés) in neighbourhoods with low social cohesion to foster local networks and trust.
- co-location in dense city quarters: co-locate both collective and commercial circular textile functions in highly dense urban areas using public or private buildings such as community centers, libraries, underused retail spaces. This increases visibility and accessibility for diverse populations.

3. design for inclusivity.
- civic carer inclusion: involve civic carers (community leaders, volunteers, local organisations) in both the design and operation of circular textile initiatives as well as in broader strategy-making.

addressees:
- *The Municipality of Amsterdam (Directie Ruimte en Duurzaamheid, Directie Economische Zaken, Directie Werk, Participatie en Inkomen)*
- *Amsterdam Economic Board*

reflection

IX

‚care-full' reflection

The spatial planning, design and research approach helped me to explore how current planning schemes, governance arrangements and civil engagement strategies are shaping the transformation of spatial structures related to the textile value chain, and to finally propose interventions for a more socially inclusive and ecologically regenerative circular transition of that sector in the metropolitan region of Amsterdam.
The aim was to use design as a tool to (1) investigate desirable institutional changes and (2) demonstrate the proposed spatial planning approaches as spatial outcomes.

The research design, methods and theories have been tailored to explore the sparsely researched social and spatial dimensions of the circular textile transition, extending the technical side of the field that has been extensively researched.

The ‚care-full CE' approach was chosen to be used to analyse and design systemic change in the regional textile value chain because it challenges the technocratic lens of circularity that leads to policies that do not address socio-spatial aspects of the transition by widening the scope of material flows to investigating deeper the people and spaces that are involved with processing those. The five aspects of care for circularity from Bono et al. (2024) helped to structure the thesis fundamentally. They provided a continuous thread throughout the research and design. Over the course of the project I developed a deeper understanding and own interpretation of them. Since they were never used to develop design principles before, I felt free to explore. For example, caring for space according to Bono et al. (2024) includes providing access to non-market spaces for communities and enhancing wellbeing, through designing spaces where people feel a sense of belonging or preserving sites of cultural heritage. I further defined the care for space to enhance the visibility of circular spaces based on my analysis results that showed a lack of those in contrast to spaces with linear textile opportunities.

The pattern language developed on the basis of my analysis and reflection on the proposed principles of care following Bono et al. (2024) within the socio-spatial context of the Metropolitan Region of Amsterdam helped me to gain an understanding of spatial and socio-ecological principles that promote and foster social circularity, and finally to propose policy recommendations based on the testing of the pattern network for the design of a regional and local textile system. An important limitation of this thesis is the testing of the pattern language with different relevant stakeholders. It was only tested in a setting with fellow urbanism students during the early design phase. During this workshop, we discovered that another limitation of this pattern set is that it does not consider quantities of textiles, but only the time-space relationship, which significantly limits the feasibility of the design in terms of textile turnover. However, this could be a next step in future research.

The Transferability of the project's findings and results is based on the inherent transferability of the pattern language as a tool, since it represents a general set of solutions for more ‚care-full' textile circularity. This makes it applicable in other settings where textile circularity is significant. However, it is important to note that this pattern set was shaped through in-depth contextual analysis and site-specific design experiments. Therefore, some adaptation may be necessary when applying it elsewhere. Such adjustments can be made by conducting a local context analysis and organising workshops with key stakeholders.

The societal relevance lies more broadly in addressing the significant global environmental and social impacts of the textile industry due to its unsustainable production and consumption patterns (EEA, 2022). In response, growing regional and local initiatives aim to develop circular strategies that reduce waste. However, many of these approaches remain narrowly focused on material flows, overlooking the broader societal dimensions of circularity (Bono et al., 2024).
This thesis explores how spatial planning can support a more inclusive and systemic transition to a circular textile economy, particularly within the Amsterdam context. It investigates how spatial interventions can help close textile loops while also addressing pressing local issues such as social segregation, loneliness, and poverty.
The research develops a critical spatial planning approach that expands the concept of circularity beyond technical solutions, integrating social and spatial dimensions. It proposes collective resource looping as a planning tool that links material reuse with community-based infrastructure and shared spaces.
By challenging existing planning systems and circular economy policies, this thesis offers recommendations for more socially just and ecologically viable planning practices. It aims to inform policymakers and planners of the uneven social and environmental impacts embedded in current circular textile strategies and to promote a more ‚care-full', community-oriented transition.

The scientific relevance lies in its contribution to the emerging body of research that critically examines the social and spatial dimensions of the circular economy, particularly within the context of regional planning and material-specific transitions. While much of the existing literature focuses on technical and economic aspects, this thesis enriches the discourse by exploring how the concept of 'care-fullness' - as proposed by Bono et al. (2024) - can be operationalised within spatial planning practices in the Metropolitan Region of Amsterdam to support a circular transition of the textile value chain.

By applying the ‚care-fullness' framework in a concrete regional context, the research offers both a theoretical and practical validation of the approach. It demonstrates that care-full spatial strategies, such as the creation of collective, adaptable, and non-market spaces for repair, remaking, and resource sharing, can actively support circular practices while addressing socio-spatial inequalities. In doing so, the project contributes to filling a critical gap in the social dimension of the circular economy, an area still underexplored in both sustainability science and planning theory (Korhonen et al., 2018; Cavallo et al., 2021).

Moreover, the research intersects with and advances debates around the spatial implications of degrowth-oriented circularity

(Savini, 2023), offering a grounded spatial perspective that highlights the importance of infrastructures of care, inclusivity, and localised agency. The proposed planning strategies illustrate how spatial planning can facilitate a degrowth-compatible circular transition, emphasising slower cycles of production and consumption, civic participation, and socio-ecological regeneration.

Although focused on textiles, the findings hold broader relevance for other material streams, such as electronic consumer goods or food systems. The care-fullness framework of Bono et al. (2024) thus presents a scalable and transferable planning approach for embedding circular principles across multiple sectors while ensuring that transitions remain socially just, locally grounded, and inclusive.

The ethical implications of relocalising textile flows to Europe - particularly to the regions of Amsterdam - center on the potential socio-economic consequences for countries in the Global South that have become integral to global textile supply chains. Th relocalisation strategy is driven by the aim to increase control over the environmental and social impacts of textile production and to enhance geopolitical resilience. However, the textile sector is highly labor-intensive (Köhler et al., 2021), and shifting production, recycling and reuse away from the Global South risks disrupting the livelihoods of millions of workers who have become dependent on these activities. These production networks were established in the first place because manufacturing was outsourced from countries of the Global North, and disrupting them may result in significant economic dislocation and social hardship in affected regions. It is beyond the scope of this study to explore and develop a strategy that addresses and evaluates this global perspective of social and environmental justice implications. However, I do hereby acknowledge and emphasize the urgency of including this perspective in further research on the relocalisation of textile flows.
Furthermore, this thesis aims to improve the conditions of circular workers, although I would like to emphasize that the proposed measures are based on secondary research findings (Suarez-Visbalet al., 2022; 2023). Therefore, further engagement is needed to verify the conclusions in the specific context of the MRA.

‚care-fullness' for radical societal change
Rather than relying on adaptive or purely technical solutions, this thesis advocates for a slow, systemic transformation of the textile value chain - one that is rooted in the principles of ‚care-full' spatial planning and driven by an ethics of social and environmental justice. This approach recognises that lasting change requires more than infrastructural interventions. It depends on empowered and engaged citizens who actively participate in shaping their environments and practices. While top-down measures are essential for enabling systemic shifts - such as providing spatial and regulatory infrastructures - they must be designed with flexibility and openness, allowing for bottom-up appropriation and local adaptation (Manzini, 2015; Rizzo et al., 2022).

This requires a shift from technocratic governance toward a model that builds civic agency and fosters the capacities of individuals and communities. As Ribeiro (2023) notes, sustainable consumption behaviours are strongly influenced by personal motivation, knowledge, skills, and time capacity - factors that are deeply shaped by the individual socio-economic situation. Therefore, policy and spatial interventions must consider the structural inequalities that inhibit people's ability to engage in circular practices. By integrating inclusive, community-oriented spaces for collective repair, making, and reuse, a care-full planning approach supports not only ecological objectives but also social empowerment, capacity-building, and community resilience (Chatterton, 2016). Ultimately, this thesis positions care-full spatial planning as a tool for radical societal change - one that reconnects environmental aims with social transformation, and transitions from a model of efficiency and control to one of solidarity, stewardship, and shared responsibility (Puig de la Bellacasa, 2017; Raworth, 2017).

Unlocking a ‚care-full' spatial planning approach
Implementing 'carefull-ness' in spatial planning means designing, funding, and managing urban and regional spaces with a deliberate focus on long-term social, economic, and environmental well-being. In the Dutch context, while there are sufficient funding budgets for circularity projects, the prevailing decision-making culture often prioritises short-term cost efficiency over long-term, systemic benefits.

A shift in decision mentality needs to be promoted within funding bodies and planning authorities so that the value of a long-term investment in social infrastructure can be recognised. Evidence should be highlighted that shows how inclusive spaces and practices contribute to social stability, which in turn leads to reductions in costs in other policy domains (e.g., health, welfare, policing).

‚Care-full' principles need to be embedded in ***municipal and regional planning policies***, with instruments like the Environmental and Planning Act (Omgevingswet) needing to be used so that spaces for circular and social functions can be protected and developed.

Societal value needs to be demonstrated through the use of pilot projects and case studies, so that the societal returns of ‚care-full' spatial planning can be tested and showcased and political and public support for broader adoption can be built.

appendix

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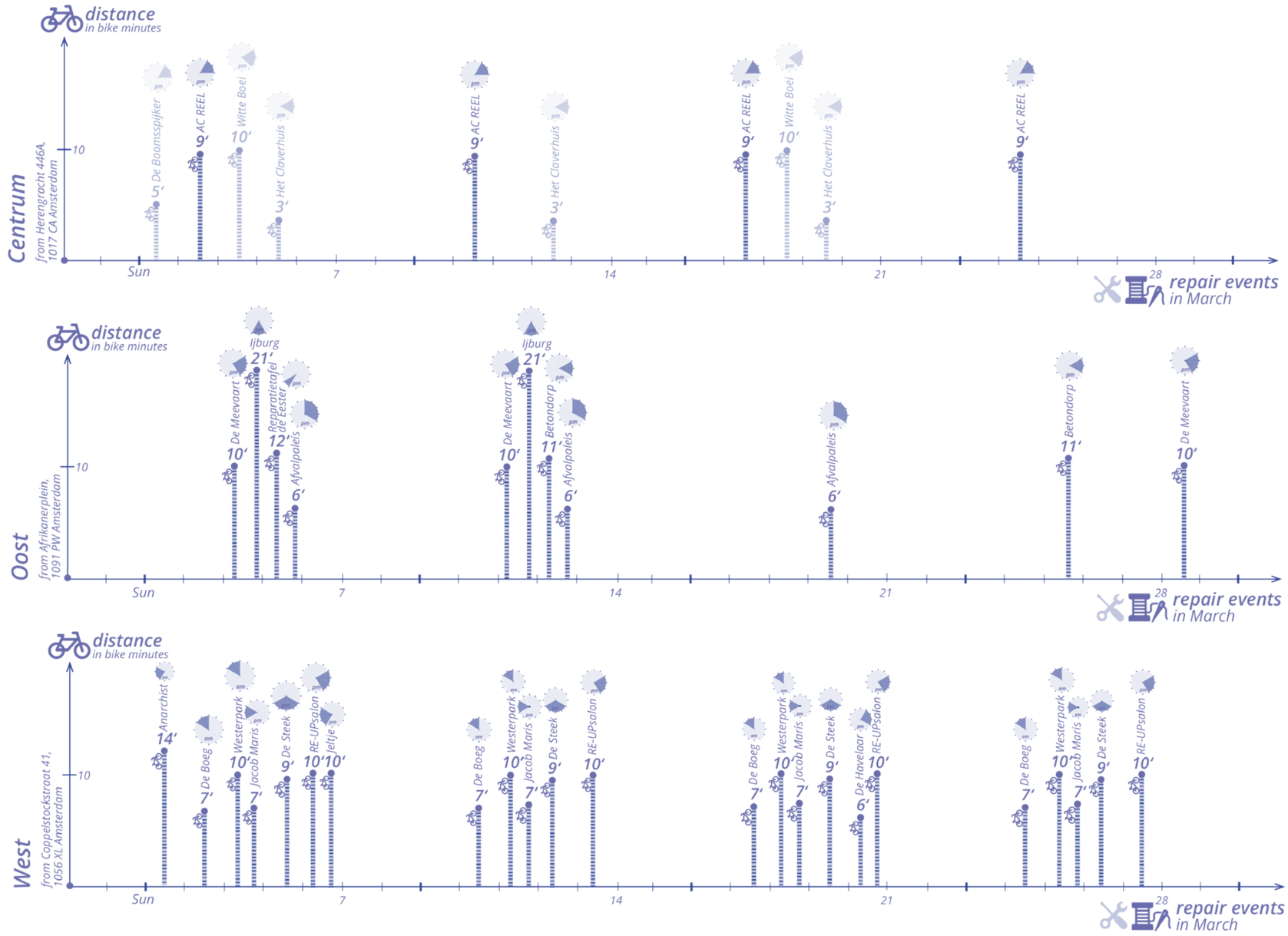

fig. 170 ***Time/space analysis for repair café accessibility in Amsterdam***
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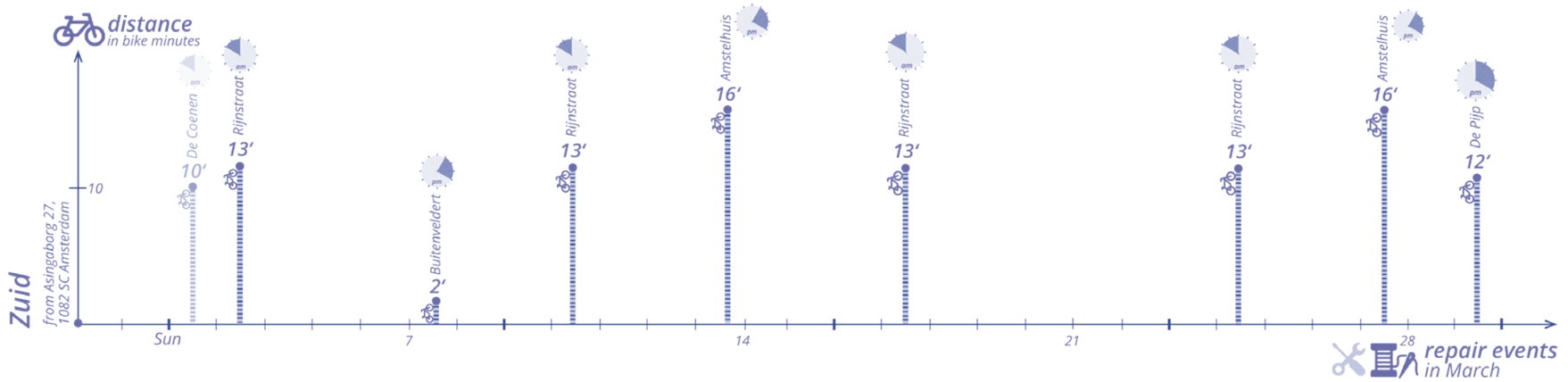


fig. 170 ***Time/space analysis for repair café accessibility in Amsterdam***
source // author

fig. 180 ***Policy analysis table, part I***
source // author

How well suited are current policies to deliver a more care-full circular textile transition?

Evaluation scores
0 - neglected
1 - recognised, but no actions specified, no tools given
2 - some actions to address the issue, but piece-meal
3 - integrated as part of the policy, with several interconnected actions, means to monitor progress, etc.

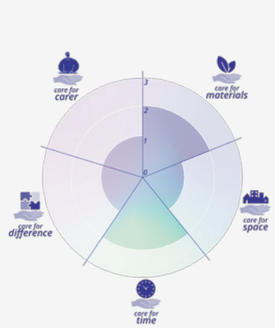
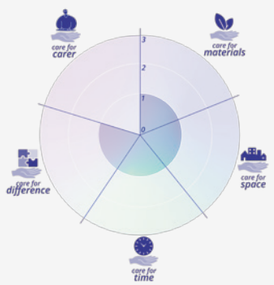
policy document	***scale***	***strategy type***	***objective***	*care for* ***carers***	*care for* ***materials***	*care for* ***space***	*care for* ***time***	*care for* ***difference***	***care-full rating***	***gaps***	***ambitions***	***opportunities***
				recognising & valuing CE workers => ethical & monetary revaluation of circular jobs in society by ensuring • *fair job quality & conditions (salary, benefits etc.)* • *equal access (across class, gender, ethnicity, etc.)* • *quality of domestic well-being*	• *valuing the non-human by aiming at higher circular strategies* • *valuing it's connection to human (learning from indigenous, informal, improvised or everyday practices based on solidarity & social justice)*	• *communal access to non-market spaces (through leveraging underused or empty spaces) - for social-circular innovation, creativity, experimentation* • *defining spatial qualities, typologies and locations for circular practices*	• *convenient time-space relations (good accessibility)* • *long-term policy instruments* • *slowing down material cycles*	• *catering to diverse human & non-human actors: affordability, age-friendliness, etc.* • *valuing local collective vision, wisdom & initiatives*				
Amsterdam Circular Strategy 2020–2025	city	circular economy	strategising the circular transition of five city-wide value chains, one of which is consumer goods including textiles and built environment	• mentions an increase in employment through circular transition in repair and raw material processing industry • need for specific skills and knowledge development for circular workers is briefly mentioned **=> neglects ensuring circular job quality => 0** • recognises need for affordable housing **=> recognises one well-being parameter => 1** • suggests circular spaces as opportunities for people with distance to the traditional labour market to find work **=> recognises opportunity for people distant to the labour market but lacks in specific actions and policies => 1**	• focuses on reducing consumption, sharing and repairing goods (policy of access over ownership) before recycling (keyword count: repair x 38, reduce x 32, reuse x 29, recycling x 17) **=> aims at higher circular strategies by proposing some actions and policy: buying less new, prioritising reused or refurbished products, forging partnerships; producer responsibility agreements => 2** • suggests circular spaces as opportunities for social functions **=> acknowledges social functions of circular actions and proposes some actions and refers to policy: investments in spatial infrastructure for repair and cooperation across sectors; spatial planning policy provides locations => 2**	• sets the goal to provide infrastructure for easy and accessible sharing & repairing **=> neglects the need for non-market spaces => 0, but aims at affordable spaces and proposes some actions and refers to policy: investments in spatial infrastructure for repair and cooperation across sectors, encourages affordable and scalable innovative projects; spatial planning policy provides locations => 2** **// overall => 1**	• aims at good accessibility of sharing & repair **=> recognises the need for convenient time-space relations (accessibility) and proposes some actions and refers to policy: investments in spatial infrastructure for repair and cooperation across sectors; spatial planning policy provides locations => 2** • mid-term strategy (5 years: 2020-2025) **=> integrated longer-term planning & strategy with interconnected actions and policies => 3** • focuses on reducing consumption, sharing and repairing goods **=> aims at slowing down material cycles by proposing some actions and policy: buying less new, prioritising reused or refurbished products, forging partnerships; producer responsibility agreements => 2** **overall => 2**	• suggests circular spaces as opportunities for people with distance to the traditional labour market to find work, for (lonely) residents to connect socially and seek leisure activities • aims for affordable sharing & repairing services **=> recognises the opportunity to cater to different social needs but lacks in specific actions and policies => 1** **=> recognises the need for cooperation for a circular transition, but lacks in specific actions and policies=> 1**		**=>** actions to improve inclusiveness of circular jobs and well-being of circular workers **=>** non-market spaces **=>** specific (spatial) requirements for improving convenience, accessibility and affordability of repair and recycling (policy refers to spatial planning policy) **=>** actions that address different social needs	**=>** recognises social functions of circular spaces **=>** focuses on slowing down material cycles (by boosting reduce, repair & reuse) rather than just closing material cycles (through recycling) **=>** aims at affordability of repair services	
Implementation Agenda for a Circular Amsterdam 2023-2026	city	circular economy	overview of municipal actions towards implementing the goals of the Circular Strategy 2020-2025	• mentions an increase in employment **=> neglects addressing differences in job quality, inclusiveness and overall well-being of workers => 0** **=> aims at supporting circular businesses in finding workers that transition from other industries to circular economy, but no specific action => 1**	• focuses on reducing, repairing and reusing goods before recycling (keyword count: repair x 24, reduce x 14, reuse x 18, recycling x 10) **=> aims at higher circular strategies by proposing some actions: partner with retailers to raise awareness, support partnerships for circular textile value chains, partner with authorities to support recycling, maximising processing contracts for collecting textiles => 2** **=> neglects social function of circular strategies => 0** **overall => 1**	• aims to provide spaces for circular innovative enterprises and initiatives such as thrift stores, repair workshops and sustainable processing businesses **=> neglects the need for non-market spaces for social circular experimentation => 0, but aims to provide spaces for circular businesses and initiatives some actions: offering temporary lease contracts on a priority basis, purchasing, renting or developing property in urban regeneration areas => 2** **overall => 1**	• does not mention accessibility of circular spaces **=> neglects to address time-space relation => 0** • short-term strategy (3 years: 2023-2026) **=> neglects need for long-term strategy => 0** **=> aims at slowing down material cycles by proposing some actions: partner with retailers to raise awareness, support partnerships for circular textile value chains, partner with authorities to support recycling, maximising processing contracts for collecting textiles => 2** **overall => 1**	• initiates discounts for repair services for low-income households **=> recognises diverse social needs and takes action: 40% discount for City Pass holders => 2** • aims at collective action by facilitating textile collective of business owners **=> approach neglects including civil actors and stakeholders into collective action => 0** • aims at collaborative learning with entrepreneurs and social initiatives **=> recognises the need for collaboration across public, private and civil sectors, but lacks in proposing actions => 1**				

fig. 180 ***Policy analysis table, part II***
source // author

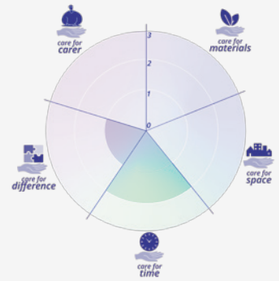
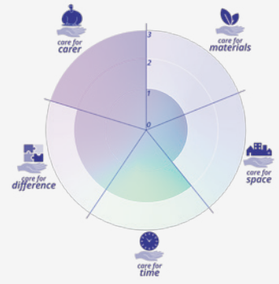
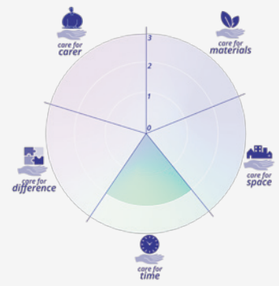
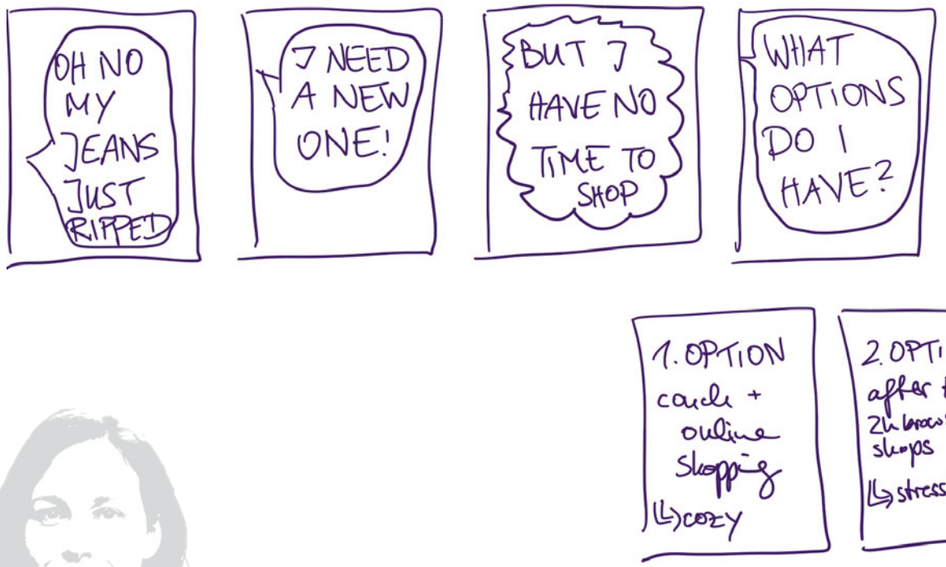
MRA Circular Textile Roadmap	region	circular textile sector	"safeguard and expand the current position" of the strong textile economy in the region by transitioning towards circularity	• mentions opportunity of creating new "decent green jobs" • mentions need for specific skills and knowledge development for circular workers is briefly mentioned **=> neglects addressing differences in job quality (e.g. between designers, technicians and sorting/logistic staff), inclusiveness and overall well-being of workers** **=> 0** • mentions the creation of jobs for newcomers and people distant to the labour market **=> mentions one project that created diverse jobs following a policy (Green Deal Circular Textiles), but suggests no actions in the roadmap to strengthen this further => 0,5** **overall => 0**	• mainly aiming at scaling up recycling of materials (one of the two main strategic spearheads), reduce, repair and reuse play subordinated roles (keyword count: recycling x 62, reduce x 2, reuse x 17 and repair x 16) **=> supports lowest circular strategy over higher ones => 0** **=> neglects social function of circular strategies => 0**	**=> neglects the need for non-market spaces => 0**	• aims at accessibility for repair • states the goal of 50% more repair places for clothing **=> recognises need for convenient time-space relation for repair spaces, proposes one action: providing repair centres => 1,5** • long-term strategy (7 years: 2022-2030) • the goals and projects lack specific deadlines **=> long-term policy with a network of projects => 3** **=> recognises the need to slow down material cycles and proposes one action: providing repair centres => 1,5** **overall => 2**	• consumers are generalised, no distinction in awareness raising strategy or support **=> neglecting to address or acknowledge diverse consumer needs => 0** • focus on collaboration **=> encourages a collective vision and strategy and proposes actions: maintaining a circular textile platform, cooperation with other EU regions => 2** • second main spearhead 'circular aesthetics' aims at supporting & connecting creative local entrepreneurial circular textiles initiatives to facilitate system-wide inspiration **=> aims to support existing local businesses initiatives with one policy: 'circular aesthetics' programme => 2** **=> neglecting civil initiatives => 0** **overall => 1**		**=>** inclusiveness of circular jobs, well-being of workers **=>** social relation with circular actions and spaces **=>** specific (spatial) requirements for repair and recycling **=>** actions that address different social needs	**=>** long-term policy with diverse interconnected projects => encourages collective vision by encouraging cooperation	
Environmental vision Amsterdam 2050	city	spatial development	setting guidelines for the design and development of the physical living environment of the city, acts as self-binding framework for the municipality for projects, policies and programs that relate to physical living environment, the vision has three functions: to provide direction for growth, accelerating transitions, provide space for initiatives	**=> fair job conditions and equal access can not be addressed in a spatial policy => n.v.** • aims to improve distance of working and living spaces for lower-skilled and practically skilled workers, transportation, affordable housing, social facilities for recreation etc. **=> improving resident's overall well-being is integral part of the policy with interconnected actions: retaining business functions near neighbourhoods, new forms of development through investment in housing collectives and cooperatives, investigating a housing fund and are making building plots available, high-quality public transport, new metro lines, transfer hubs, landscape parks with recreation => 3**	• determines the industrial port as circular hub for recycling and processing of materials • aims to make space for productive economy near residential neighbourhoods, mentions the creation of 'productive neighbourhoods' **=> recognises the need for circular spaces for higher strategies such as repairing, reusing and sharing in residential areas and proposes actions: preservation of productive activity in the city; zoning of mixed and urban neighbourhoods and eye-catching urban centres with business opportunities, yet it remains unclear how those new structures can be integrated => 2** **=> neglects the social function and relation of circular strategies => 0**	• aims to create more room for experiments with new forms of co-creation and democratic renewal **=> and proposes some (vague) actions: investigation of value creation in city development, municipal housing investments, broadening current range of development forms with housing collectives and cooperatives => 1,5**	• aims at accessibility of circular services **=> recognises the need for convenient time-space relations for circular spaces and proposes actions and policy: integrating small-scale businesses in residential neighbourhoods, Circular Area Development framework, yet it remains unclear how those new structures can be integrated => 2** **=> recognises the need to slow down material cycles by making repairing, reusing and sharing in residential areas possible with some actions: preservation of productive activity in the city; zoning of mixed and urban neighbourhoods and eye-catching urban centres with business opportunities, yet it remains unclear how those new structures can be integrated => 2**	• addresses different needs of diverse citizen groups and conditions of the natural environment **=> recognises diverse human & non-human needs and conditions and proposes actions and policies: rethinking financial principles of area development and agreements with housing corporations; inclusive policy => 2** • aims to utilise collective knowledge and support local vision-making by giving 'residents a more active and equal role' in city development **=> recognises local collective vision & wisdom and proposes a policy and an action: the Agenda for 'Samen stadmaken'; using new digital resources for equal information provision, yet this is only aiming at transparency of decisions and information, not about actively involving citizens => 1**		=> neglects the social function and relation of circular strategies => lacks in proposing effective actions for active involvement of citizen into city development processes	=> addresses overall well-being of workers, in particular by planning working and living spaces closer together for lower-skilled and practically skilled workers => aims at mixing productive activities with residential functions, therefore allowing circular initiatives closer to areas of consumption and use => aims to reevaluate value creation of city development towards social values	=> highlighting and distinguishing locations and structural opportunities for small-scale circular functions such as repair, sharing and refurbishing textiles in neighbourhoods
Retail Policy 2018-2022	city	economy	ensuring attractive and strong shopping areas spread across the city	• mentions growing employment in retail **=> neglects ensuring circular job quality => 0** **=> neglects equal access to circular jobs => 0** **=> neglects well-being of workers => 0**	• mentions retail types for second-hand next to new goods, but they are handled as equally important **=> neglects higher circular strategies such as refuse, rethink and reduce by solely suggesting reuse, but also strengthening the consumption of new goods => 0** **=> neglects social function of circular strategies => 0**	• targets commercial retail **=> neglects the need for non-market spaces => 0**	• aims for accessible retail locations **=> enables convenient time-space relation by proposing some actions: groceries nearby for residents; multiple attractive shopping areas, also outside the city centre; subordinate retail coupled within repair businesses is excluded from the retail clustering rule, which means they can be integrated into residential areas => 2**	**=> neglects diverse human & non-human needs and conditions => 0** **=> neglects to value collective vision & wisdom => 0**		=> neglects workers job quality, equal access and well-being => neglects higher circular strategies and even boosts overconsumption by expanding shopping locations => neglects social function of circular strategies => neglects the need for non-market spaces => neglects diverse human & non-human needs => neglects to value colelctive vision & wisdom	=> ensures accessibility	=> making a distinction and prioritising specific areas for retail of second-hand over new goods => pairing repair services with (subordinate) retail functions allows more spread locations

fig. 181 ***Policy analysis table (synthesised)***
source // author

type of care	*care for* ***carers***	care for **materials**	*care for* ***space***	*care for* ***time***	*care for* ***difference***
definition of 'care-full' aspect analysed	recognising & valuing CE workers through ethical & monetary revaluation of circular jobs in society by ensuring • fair job quality & conditions (salary, benefits etc.) • equal access (across class, gender, ethnicity, etc.) • quality of domestic well-being • shifting consumers to carers by raising awareness	• valuing the non-human by aiming at higher circular strategies • valuing it's connection to human (learning from indigenous, informal, improvised or everyday practices based on solidarity & social justice)	• communal access to non-market spaces (through leveraging underused or empty spaces) - for social-circular innovation, creativity, experimentation • defining spatial qualities, typologies and locations for circular practices	• convenient time-space relations (good accessibility) • long-term policy instruments • slowing down material cycles	• catering to diverse human & non-human actors: affordability, age-friendliness, etc. • valuing local collective vision, wisdom & initiatives
recognised challenges	• need for specific skills and knowledge development for circular workers (1, 2, 3) • need for affordable housing (1,4)	-	• lack of affordable physical space (2)	-	-
recognised opportunities	• increased employment (1,2, 5) • opportunities for people with distance to the traditional labour market (1,3)	• circular spaces as opportunities for social functions (1)	-	-	• circular spaces as opportunities for diverse workers, for (lonely) residents to connect socially (1)
ambitions	• supporting circular businesses in finding carers (2) • improve distance of working and living spaces for lower-skilled and practically skilled workers, transportation, affordable housing, social facilities for recreation (4) • partner with retailers to raise awareness (2)	• focus on reducing, repairing and reusing goods before recycling (1,2) • focus on scaling up recycling of materials (3)	• preservation of productive activity in the city (4) • zoning of mixed and urban neighbourhoods (4) • urban centres with business opportunities (4) • more room for experiments with new forms of co-creation and democratic renewal (4) • providing 'suitable' spaces for reuse, repair, resale and rental (2) • 50% more repair places for clothing (3)	• good accessibility of sharing & repair (1,3) • accessible retail locations (5)	• affordable sharing & repairing services (1) • collaborative learning with entrepreneurs and social initiatives (2) • supporting & connecting creative local entrepreneurial circular textiles initiatives (3) • utilise collective knowledge and support local vision-making in city development (4)
defined actions	4 defines actions for workers well-being: • retaining business functions near neighbourhoods • new forms of development through investment in housing collectives and cooperatives • investigating a housing fund • making building plots available • high-quality public transport • new metro lines and transfer hubs • landscape parks with recreation	-	• industrial port as circular hub for recycling and processing of materials (4) • providing repair centres (3) • investments in spatial infrastructure for repair and cooperation across sectors (1)	• excluding subordinate retail coupled within repair businesses from the retail clustering rule, which means they can be integrated into residential areas (5)	• facilitating textile collective of business owners (2) • support existing local businesses initiatives (3)
gaps	• ***all neglect to define actions for ensuring job quality, diversity of jobs and equal access to circular jobs***	• ***policy for circular textiles in the MRA (3) focuses on lower r-strategy*** • ***lack of defining characteristics and actions for social function of circular spaces (1)***	• ***lack of defining specific spatial qualities and typologies for circular activities (1,2,3,4)***	• ***lack of defining accessibility and specific actions to achieve it (1,3)***	• ***recognises the opportunity to cater to different social needs but lacks in specific actions (1)*** • ***lack of actions for affordable services (1)*** • ***neglects including civil actors and stakeholders into networks (2)***
strengths	• ***4 addresses overall well-being of workers with specific actions***	-	• ***4 defines broad locations for circular practices (port, neighbourhoods, urban centres)***	• ***allowing repair-coupled retail in residential areas (5)***	• ***support existing local businesses initiatives (3)***

care for difference
daily textile consumption journey based on persona



Janneke (female, 35)
- *wo-education at Amsterdam University*
- *strategic project manager*
- *4 days/week in HO*
- *1 day/week in office Amsterdam Zuid-Oost*
- *above average income*
- *gym exercise 3 times/week*

(based on socio-economic statistics p. X)

fig. 182 ***ai-generated picture of persona***
source // chatgpt, adapted by author

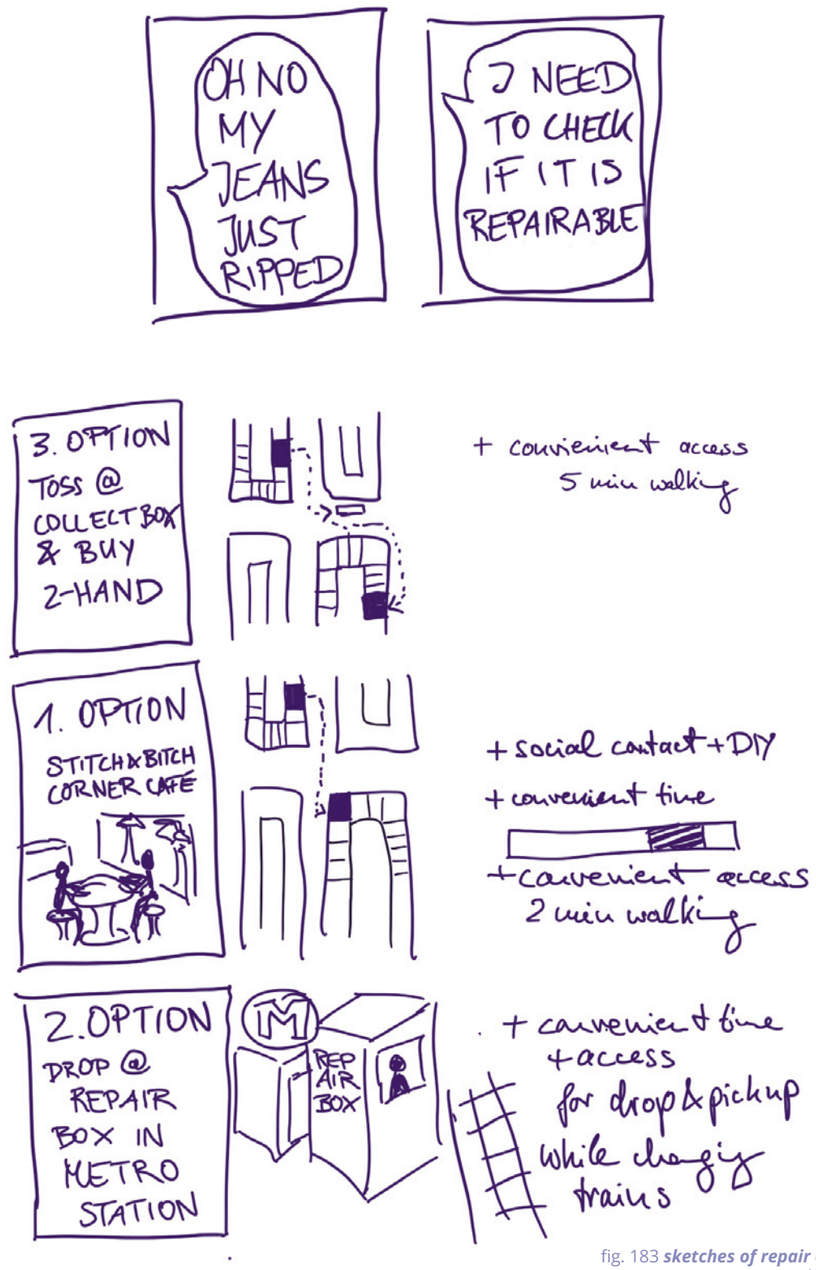


fig. 183 ***sketches of repair options***
source // author

a ‚care-full' circular textile vision
for the Metropolitan Region Amsterdam

fig. 184 ***Cross-scalar vision map showing resource flows represented with wool threads***
source // author